

PC Solutions & Integration, Inc.

Proposal for

Beaufort County School District

Network Electronics Systems and Services, 26-007

Technical Proposal

Due: December 1, 2025 @ 4PM EST

Prepared By: Katie Simpson

Beaufort County School District

ADDENDUM 2

Solicitation Number:	26-007
Date Printed:	November 3, 2025
Date Issued:	November 3, 2025
Procurement Officer:	Kaylee Yinger, CPPB
Phone:	843-322-2349
Email:	Kaylee.Yinger@beaufort.k12.sc.us

Request for Proposal (RFP)

DESCRIPTION:	**Network Electronics Systems and Services**
SUBMIT OFFER BY (Opening Date & Time):	**December 1, 2025 @ 4:00 PM EST**
QUESTIONS MUST BE RECEIVED BY:	**November 6, 2025 @ 4:00 PM EST**
NUMBER OF COPIES TO BE SUBMITTED:	**Six (6) Original Signed Copies** **Two (2) USB - One (1) Redacted** **Bidnet (1) Original, (1) Redacted**

Offers must be submitted in a sealed package. Solicitation Number & Opening Date must appear on package exterior.

SUBMIT YOUR SEALED OFFER TO EITHER OF THE FOLLOWING ADDRESSES:

PHYSICAL ADDRESS:
Beaufort County School District
Procurement Office
2900 Mink Point Blvd
Beaufort, SC 29902

Electronic Bid Submissions will be accepted through the following we address: Here

AWARDS & AMENDMENTS:
Award will be posted at the Physical Address stated above on or after December 2, 2025. The award, this solicitation, and any amendments will be posted at the following web address: http://beaufortschools.net.

You must submit a signed copy of this form with Your Offer. By submitting a proposal or bid, You agree to be bound by the terms of the Solicitation. You agree to hold Your Offer open for a minimum of ninety (90) calendar days after the Opening Date.

NAME OF OFFEROR: (Full legal name of business submitting the offer) PC Solutions & Integration, Inc.

ENTITY TYPE: S Corporation

AUTHORIZED SIGNATURE (Person signing must be authorized to submit binding offer to enter contract on behalf of Offeror named above)

Katie Simpson
PRINTED NAME

Senior Account Executive
TITLE

Instructions regarding Offeror's name: Any award issued will be issued to, and the contract will be formed with, the entity identified as the Offeror above. An offer may be submitted by only one legal entity. The entity named as the Offeror must be a single and distinct legal entity. Do not use the name of a branch office or a division of a larger entity if the branch or division is not a separate legal entity, i.e., a separate corporation, partnership, sole proprietorship, etc.

Beaufort County School District

ADDENDUM 1

Solicitation Number:	26-007
Date Printed:	November 3, 2025
Date Issued:	November 3, 2025
Procurement Officer:	Kaylee Yinger, CPPB
Phone:	843-322-2349
Email:	Kaylee.Yinger@beaufort.k12.sc.us

Request for Proposal (RFP)

DESCRIPTION:	**Network Electronics Systems and Services**
SUBMIT OFFER BY (Opening Date & Time):	**December 1, 2025 @ 4:00 PM EST**
QUESTIONS MUST BE RECEIVED BY:	**November 6, 2025 @ 4:00 PM EST**
NUMBER OF COPIES TO BE SUBMITTED:	**Six (6) Original Signed Copies** **Two (2) USB - One (1) Redacted** **Bidnet (1) Original, (1) Redacted**

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PRINTED NAME: Katie Simpson

TITLE: Senior Account Executive

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Beaufort County School District

Solicitation Number:	26-007
Date Printed:	September 30, 2025
Date Issued:	October 20, 2025
Procurement Officer:	Kaylee Yinger, CPPB
Phone:	843-322-2349
Email:	Kaylee.Yinger@beaufort.k12.sc.us

Request for Proposal (RFP)

DESCRIPTION:	**Network Electronics Systems and Services**
SUBMIT OFFER BY (Opening Date & Time):	**November 17, 2025 @ 4:00 PM EST**
QUESTIONS MUST BE RECEIVED BY:	**November 6, 2025 @ 4:00 PM EST**
NUMBER OF COPIES TO BE SUBMITTED:	**Six (6) Original Signed Copies** **Two (2) USB - One (1) Redacted** **Bidnet (1) Original, (1) Redacted**

Offers must be submitted in a sealed package. Solicitation Number & Opening Date must appear on package exterior.

SUBMIT YOUR SEALED OFFER TO EITHER OF THE FOLLOWING ADDRESSES:

PHYSICAL ADDRESS:
Beaufort County School District
Procurement Office
2900 Mink Point Blvd
Beaufort, SC 29902

Electronic Bid Submissions will be accepted through the following we address: Here

AWARDS & AMENDMENTS:
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Katie Simpson
PRINTED NAME

Senior Account Executive
TITLE

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(Return Page Two with Your Offer)

HOME OFFICE ADDRESS (Address for Offeror's home office/ Principal place of business):	NOTICE ADDRESS (Address to which all procurement and contract related notices should be sent):

PHONE NUMBER: 305-667-0633 or 706-499-5583

EMAIL ADDRESS: ksimpson@pcsusa.net

PAYMENT ADDRESS (Address to which payments will be sent):	ORDER ADDRESS (Address to which all purchase orders will be sent):
☐ Payment Address Same as Home Office Address ☐ Payment Address Same as Home Notice Address (check one only)	☐ Payment Address Same as Home Office Address ☐ Payment Address Same as Notice Address (check one only)

ACKNOWLEDGEMENT OF AMENDMENTS:	Amendment Number	Amendment Issue Date
	1	11/3/2025
	2	11/3/2025
Offeror acknowledges receipt of amendments by indicating amendment number and its date of issue.	3	11/3/2025

MINORITY PARTICIPATION- Are you a Minority Business Enterprise: Yes ☑ No ☐
If yes, please include a copy of your certification.

November 18, 2025

Beaufort County School District
Procurement Office
2900 Mink Point Blvd
Beaufort, SC 29902

RE: PC Solutions & Integration, Inc. Response to RFP #26-007 Network Electronics Systems and Services

Dear Beaufort County School District Evaluation Committee,

PC Solutions & Integration, Inc. (PCS) is pleased to submit our response to RFP #26-007 for Network Electronics Systems and Services. PCS has proudly served Beaufort County School District for more than five years, delivering reliable network infrastructure, wireless solutions, and high-quality support services. Since being awarded the district's network electronics contract in 2020, we have partnered closely with BCSD's IT leadership to implement a secure, scalable, and high-performing network foundation.

Founded in 1995, PCS has grown into one of the largest networking integrators in the Southeast, with deep experience supporting K-12 school districts across South Carolina, Georgia, Florida, and beyond. As one of only **four Elite Plus partners in the United States** with Extreme Networks, PCS brings nationally recognized engineering expertise, advanced technical certifications, and a proven track record of successful large-scale deployments in K-12 environments.

Our principal strengths include:

- Decades of specialized experience in enterprise network integration for education
- A highly certified engineering team with extensive Extreme Networks expertise
- Strong project management, installation, and post-implementation support capabilities
- Longstanding relationships with minority- and woman-owned subcontractors
- A service-driven culture focused on responsiveness, transparency, and operational excellence

For the purposes of this proposal, **Katie Simpson, Senior Account Manager**, will serve as the District's primary point of contact throughout all clarifications, discussions, and negotiations. Ms. Simpson is fully authorized to speak and negotiate on behalf of PCS regarding all technical, pricing, contractual, and service-related matters associated with this RFP.
Phone:
Email:

PCS appreciates the opportunity to continue supporting Beaufort County School District. We are confident that our experience, technical strength, and commitment to exceptional service make PCS the ideal partner for this engagement. Should the Evaluation Committee have any questions, we welcome the opportunity to provide additional clarification or detail.

Thank you for your consideration.

Sincerely,

Katie Simpson

Katie Simpson
Senior Account Executive
PC Solutions & Integration, Inc. (PCS)

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Executive Summary

Executive Summary

For more than five years, PCS has been a trusted technology partner to Beaufort County School District, providing network infrastructure, wireless solutions, and ongoing support that help power instruction and administration across the district. Since being awarded the network electronics contract in 2020, PCS has worked hand in hand with BCSD's IT leadership to design, implement, and maintain a high-performing, secure, and scalable networking environment. As **one of only four Elite Plus** partners in the United States with Extreme Networks, PCS brings nationally recognized expertise, advanced engineering capabilities, and unmatched technical proficiency to every project we support.

Our Continued Commitment to Beaufort County Schools

PCS understands the unique challenges and goals of K–12 environments, balancing performance, security, manageability, and cost-effectiveness. Over the past several years, we have developed an intimate knowledge of BCSD's infrastructure, ensuring that our team is fully equipped to deliver seamless continuity as the District modernizes its network.

Our proposal builds upon this successful foundation, offering enhanced solutions that leverage your existing investment in Extreme Networks to provide a next-generation, cloud-managed infrastructure. By maintaining platform consistency and interoperability with your current systems, BCSD can avoid costly reinvestment and continue benefiting from a unified, manageable network architecture.

Why Extreme Networks

BCSD already utilizes Extreme Networks solutions districtwide, a proven and reliable foundation for connectivity, security, and management. Extreme's technology offers unmatched visibility, automation, and cloud-based control, allowing IT administrators to simplify operations while improving reliability and security. With over 20,000 educational institutions worldwide relying on Extreme's end-to-end solutions, BCSD joins a global community of learning organizations benefiting from innovation built for education.

Why PCS

Founded in 1995, PCS is one of the largest and most experienced networking integrators in the Southeastern United States, specializing in education and government technology solutions. We have partnered with Extreme Networks for nearly two decades and hold their highest engineering certifications, including the *Enterprise Network Master* designation, the first company in North America to achieve it.

Our engineering-first philosophy ensures that every PCS solution is technically sound, future-ready, and tailored to each client's environment. With a staff ratio of three engineers

for every sales professional, PCS prioritizes deep technical expertise, responsive support, and meticulous project execution.

Notable highlights include:

- **Five-year proven partnership with BCSD**, providing dependable service and support.
- **Over 30 years of experience** in K–12 and higher education networking.
- **Multiple Extreme Networks Partner of the Year awards.**
- **Local presence and certified engineering staff** supporting South Carolina and the Southeast region.
- **E-rate expertise**, including , ensuring compliant and efficient funding processes.

Our Promise

PCS is deeply committed to BCSD's mission of providing reliable, high-speed, and secure network access to every student and staff member. Our proposal represents a continuation of the successful partnership established in 2020, enhancing BCSD's current environment with next-generation solutions, dedicated local support, and long-term strategic value.

Together, **PCS and Extreme Networks** will continue to help Beaufort County School District achieve its network modernization goals with confidence, efficiency, and sustainability.

Sincerely,

Katie Simpson

Katie Simpson

Senior Account Executive

PC Solutions & Integration, Inc.



4.0.1.4 Narrative on Approach to Scope of Work

Extreme networks

pcs Simplify with Technology

4.0.1.4 NARRATIVE ON APPROACH TO SCOPE OF WORK

Pre-Planning, Procurement Phase and Staging

Upon contract award, PCS will procure all equipment listed, the appropriate supporting materials to assist with the installation process, and additional spares to replace certain equipment, in case of manufacturer's defect or shipping damage. The procurement process is currently estimated, per our vendors, to be approximately a 60-day lead time.

Once the equipment arrives from the vendor to our Miami office, it will be pre-configured with the following:

- Agreed upon recommended Software version for all equipment.
- Equipment Burn-in to test the equipment and recognize any dead-on-arrival equipment or any other hardware issues. All DOA equipment will be returned to manufacturer for replacements.
- Any agreed upon Base configuration,
- Install any required hardware like modules, PSU's, Fans, and mounting ears etc.
- Organize and label according to task(s)/location(s), depending on the implementation plan, and will be re-packaged for shipment to the designated customer location(s) as agreed upon.
- Inventory will be taken and documented prior to shipment of the equipment out of our Miami office, to allow for re-verification of receipt once it is received at the specified customer location(s) and staged at the installation location, if different.
- Based on the inventory the equipment will be organized at Customer location according to the schools and the respective IDF's/MDF's
- PCS can also hold equipment at our warehouse, if needed, till the date of installation.

A kick-off meeting will be held with all relevant stakeholders to review the proposal, solution, and address any questions, concerns, and/or risks. After the kick-off meeting, the PCS Project Team will develop an installation, test, and cutover plan as well as a milestone schedule. An Implementation Review will be held to review this plan and agree to any necessary additions or changes at this time.

After the agreement is received on the schedule and the plan, all PCS related resources will be scheduled at this time.

Project Management

PCS will designate a Project Manager to be responsible for overseeing the project. The PCS Project Manager will be the single point of contact (SPOC) for the customer for all issues related to the implementation, testing, and cutover phases of this project. The Project Manager will manage and task all PCS-related personnel on-site.

As part of PCS' basic project management process, the Project Manager will:

- Develop any additional support materials Bill of Materials (BOM) for Procurement
- Review the ordered equipment and purchase based on agreed upon dates.
- Develop an installation spares plan for Procurement
- Develop a communication plan between PCS and the customer that will establish the time and frequency for status conference calls, on-site meetings, and review and closure

of Action Items related to the installation process
- Develop an installation, test, and cutover plan specific to the chosen solution and needs/requirements that are to be discussed during the initial kick-off meeting. The test plan will be developed in conjunction with the customer. PCS will provide the necessary input in all matters based on our extensive experience in Educational institutions.
- Develop and maintain a milestone schedule
- Conduct an Implementation Review to review the plan and schedule to set mutual expectations
- Coordinate pre-configuration, staging, and organizing of procured equipment and supporting materials per the specified plan
- Coordinate pre-shipment inventory documentation
- Coordinate equipment delivery to specified customer location(s)
- Manage the requirements/solutions change request process
- Determine and schedule appropriate PCS related resources

Switch Installation

- After the Pre-planning and staging services are performed, the equipment will be organized according to the locations, schools, IDF's etc.
- The configuration provided by the School networking team will be uploaded to the respective switches.
- These switches will then be mounted in parallel with the existing equipment if possible. This would ease the cable transition to the new equipment.
- If not, cables will be labeled based on VLAN's etc. and then moved to the new switches to the appropriate ports.
- PCS recommends color coding the patch cables based on VLAN's. This would provide clear demarcation for future needs. Please note that the patch cords are not included in this proposal.
- Once the IDF's are connected back the core switches, the necessary tests will be performed in conjunction with the School's networking team.
- Complete other IDF's in parallel to keep with the 8 hours timeline for most schools.
- Troubleshoot in conjunction with the customer if necessary and provide day 2 support.

AP Implementation

- Create location-based profiles in the wireless management portal.
- Create profiles based on SSID's, power levels, and channel plans. These will be prepared with input from customer as well as extensive wireless and education environment knowledge of PCS staff.
- Label the AP's based on location or any other parameter required by the customer.
- Mount the AP's on Ceiling or wall in enclosures, as needed
- AP's will receive their IP addressing via DHCP.
    - PCS will verify connectivity by verifying green light is illuminated.
- Onboard the AP's into the management portal and place them in the required location segments created.
- PCS team is responsible for documenting the following:
    - Serial Numbers

    - MAC Addresses
    - Data cable ID
    - Location Description
    - Any other Customer requirement
- PCS to place existing AP's in the empty boxes that contained the new AP's and place them in a customer defined location for any replacements.
- Scope assumes ceiling heights not to exceed 20'.
- Develop, maintain, and close an Action Item List to address major tasks, issues, concerns, etc. during the installation process
- Develop an Equipment Asset List during the installation to include, but not limited to, location, serial number, MAC address, etc.
- Conduct Project Closure Meeting to ensure all tasks have been completed and all action items have been addressed and closed

Project Change Request (PCR)

Client _____ Date of Request _____
Submitted By _____ Project Number _____
PCS SPOC _____

Request

Description of Change:

_____
_____
_____

Reason for Change:

_____
_____
_____

Response

Effect on Project Schedule:

_____
_____

Risks Associated with Change:

_____
_____

Additional Labor (hrs) _____ **Additional Cost (USD)** _____

Quote Number _____

ACCEPTED AND AGREED as of the first date written by the following authorized party representatives.
Signature below indicates the Client and PCS' acceptance of this change order form and actions and responsibilities herein.

PC Solutions & Integration, Inc. (PCS)	**Client**
Authorized Signature: _____	Authorized Signature: _____
Print Name & Title: _____	Print Name & Title: _____
Date: _____	Date: _____

NETWORK IMPLEMENTATION PROJECT PLAN TEMPLATE

[CUSTOMER/ORGANIZATION NAME]

SAMPLE

Document Date: [DATE]

NIPP #: Sample005

Version: 005

Prepared By:

PC Solutions & Integration

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SAMPLE

1 Introduction

1.1 Purpose

This subsection of the Project Implementation Plan describes the purpose of the plan and identifies the system to be implemented.

1.2 System Overview

This subsection of the Project Implementation Plan provides a description of the system to be implemented and its organization.

1.2.1 Assumptions and Constraints

This subsection of the Project Implementation Plan describes the assumptions made regarding the development and execution of this document as well as the applicable constraints. Some items to consider when identifying the assumptions and constraints are:

- Schedule
- Budget
- Resource availability and skill sets,
- Software and other technology to be reused or purchased,
- Constraints associated with product interfaces

1.2.2 System Organization

This subsection of the Project Implementation Plan provides a description of the system structure and the major system components essential to its implementation. It should describe both hardware and software, as appropriate. Charts, diagrams, and graphics may be included as necessary to provide a clear picture of the system.

2 Management Overview

This section of the Project Implementation Plan provides a description of how the implementation will be managed and identifies the major tasks involved.

2.1 Description of Implementation

This subsection of the Project Implementation Plan provides a description of the planned deployment, installation, and implementation approach. Include whether the system will be implemented using a phased approach.

2.2 Points-of-Contact

This subsection of the Project Implementation Plan identifies the System Proponent, the name of the responsible organization(s), titles, and telephone numbers of the staff who serve as points of contact for the system implementation. These points-of-contact should include the representatives with responsibilities relating to the system implementation. The site

SAMPLE

implementation representative for each field installation or implementation site should also be included, if appropriate.

Add additional lines as needed to the table. If the applicable team members are listed in the Project Management Plan, reference the appropriate section within that document.

Role	Name	Contact Number

Table 2.2 – Points-of-Contact

2.3 Major Tasks

This subsection of the Project Implementation Plan provides descriptions of the major system implementation tasks. Add as many subsections as necessary to this subsection to describe all the major tasks. The tasks described in this subsection are not site-specific, but generic or overall project tasks that are required to install hardware, software, and databases, prepare data, and validate the system

If several implementation approaches are being reviewed, then identify the advantages, disadvantages, risks, issues, estimated time frames, and estimated resource requirements for each option considered. These options could include:

- Incremental implementation or phased approach
- Parallel execution
- One-time conversion and switchover
- Any combinations of the above.

Include the following information for the description of each major task, if appropriate:

- What the task will accomplish
- Resources required to accomplish the task

SAMPLE

- Key person(s) responsible for the task
- Criteria for successful completion of the task (e.g., "user acceptance")

Examples of major tasks are the following:

- Provide overall planning and coordination for the implementation
- Provide appropriate training for personnel
- Provide all needed technical assistance
- Perform site surveys before implementation
- Ensure that all prerequisites have been fulfilled before the implementation date
- Provide personnel for the implementation team
- Acquire special hardware or software
- Perform configuration conversion before configuring the new system
- Prepare site facilities for implementation

Consider addressing the changes that may be necessary once the system has been implemented. These changes may include, but are not limited to, personnel and technology equipment alignment, and contractor support.

2.4 Implementation Schedule

This subsection of the Project Implementation Plan provides a schedule of activities to be accomplished. Show the required tasks (described in Subsection 2.3, Major Tasks) in chronological order, with the beginning and end dates of each task. If MS Project is used to plan the implementation, include the project Gantt chart. Include any milestones from the projects that are dependent on this project and vice-versa.

SAMPLE

3 Implementation Support

This section of the Project Implementation Plan describes the support hardware, software, facilities, and materials required for the implementation, as well as the documentation, necessary personnel and training requirements, outstanding issues and implementation impacts to the current environment. The information provided in this section is not site-specific. If there are additional support requirements not covered by the subsequent sections, others may be added as needed.

3.1 Hardware, Software, Facilities, and Materials

This subsection of the Project Implementation Plan lists all support hardware, software, facilities, and materials required for the implementation.

3.1.1 Hardware

This subsection of the Project Implementation Plan provides a list of support equipment and includes all hardware used for installing and testing. This hardware may include computers, servers, peripheral equipment, diagnostic equipment, other non-computer equipment as well as any network and data communication requirements. The description should include the specific models, versions, and configuration settings. Also include information about manufacturer support, licensing, and maintenance agreement details.

If this information is recorded in another document or system, such as the Configuration Management Plan or tool, identify that item here. Otherwise, refer to the Hardware Inventory table in Appendix B.

3.1.3 Facilities

This subsection of the Project Implementation Plan identifies the physical facilities, accommodations and their location(s) required during implementation. Examples include physical workspace for assembling and testing hardware components, desk space for software installers, floor space for equipment, and classroom space for training the implementation staff. Specify the hours per day needed, number of days, and anticipated dates.

If the facilities needed are site-specific, provide this information in Section 4, Implementation Requirements by Site.

3.1.4 Materials

This subsection of the Project Implementation Plan identifies any other consumables (i.e. technology, supplies, and materials) required to support the implementation.

If the materials needed are site-specific, provide this information in Section 4, Implementation Requirements by Site.

SAMPLE

3.2 Documentation

This subsection of the Project Implementation Plan lists any additional documentation needed to support the deliverable system.

3.3 Personnel

This subsection of the Project Implementation Plan describes committed and proposed staffing requirements. Describe the training, if any, to be provided for the implementation staff.

3.3.1 Staffing Requirements

This subsection of the Project Implementation Plan describes the number of personnel, length of time needed, types of skills, skill levels, expertise, and any necessary security clearances for the staff required during the implementation period. If particular staff members have been selected or proposed for the implementation, identify their roles and responsibilities.

3.3.2 Training of Implementation Staff

This subsection of the Project Implementation Plan addresses the training, if any, necessary to prepare staff for implementing the system; it does not address user training.

Describe the type and amount of training required for each of the following areas, if appropriate, for the system:

- System hardware/software installation
- System support
- System maintenance and modification

List the courses that will be provided, a course sequence, and a proposed schedule. If appropriate, identify which courses particular types of staff should attend by job position description.

If one or more commercial vendors will provide training, identify them, the course name(s), and a description of the course content.

If Center staff will provide the training, provide the course name(s) and an outline of the content of each course. Identify the resources, support materials, and proposed instructors required to teach the course(s).

3.4 Outstanding Issues

This subsection of the Project Implementation Plan states any known issues or problems relevant to implementation planning. This section answers the question, “Are there any specific issues, restrictions, or limitations that must be considered as a part of the deployment?”

If issues are site-specific, provide this information in Section 4, Implementation Requirements by Site.

SAMPLE

3.5 Implementation Impact

This subsection of the Project Implementation Plan describes how the system's implementation is expected to impact the network infrastructure, support staff, user community, etc.

If impacts are site-specific, provide this information in Section 4, Implementation Requirements by Site.

3.6 Performance Monitoring

This subsection of the Project Implementation Plan describes performance monitoring techniques and how they will be used to help determine if the implementation is successful.

3.7 Configuration Management Interface

This subsection of the Project Implementation Plan describes Configuration Management, such as when versions will be distributed.

4 Implementation Requirements by Site

This section of the Project Implementation Plan describes site-specific implementation requirements and procedures. If requirements and procedures differ by site, provide this information in an appendix and reference it here.

4.1 Site Name or Identification for Site X

This subsection of the Project Implementation Plan identifies the site by name, location and ownership.

4.1.1 Site Requirements

This subsection of the Project Implementation Plan defines the requirements that must be met for the orderly implementation of the system and describes the hardware, software, and facilities requirements for this site.

Any site requirements that do not fall into the following three categories and were not described in Section 3, Implementation Support, may be described in this subsection, or other subsections may be added following Facilities Requirements below:

- Hardware Requirements -- Describe the hardware requirements necessary to support the implementation (such as, workstations that will run on a LAN).
- Firmware/Software Requirements -- Describe any firmware/software required to implement the system.
- Facilities Requirements -- Describe the physical facilities and accommodations required during the system implementation period. Some examples of this type of information are provided in Section 3, Implementation Support.

SAMPLE

4.1.2 Site Implementation Details

This subsection of the Project Implementation Plan addresses the specifics of the implementation for this site. Include a description of the implementation team, schedule, procedures, and database and data updates. This subsection should also provide information on the following:

- Team -- If an implementation team is required, describe its composition and the tasks to be performed at this site by each team member.
- Schedule -- Provide the subsection of the master implementation schedule described in paragraph 2.4, Implementation Schedule, above that applies to this site.
- Procedures -- Provide the detailed procedures required to accomplish the implementation at this site. If necessary, other documents may be referenced. If appropriate, include a step-by-step sequence of the detailed procedures. A checklist of the installation events may be provided to record the results of the process.

    - If the system will replace an already operating system, then address the cutover processes in detail.
    - If there is a period of parallel operations with an existing system, then address the procedures that include technical and operations support during the parallel operation period.

4.1.3 Risks and Contingencies

This subsection of the Project Implementation Plan identifies the risks and specific actions to be taken in the event the implementation fails or needs to be altered at any point and includes the factors to be used for making the decision.

4.1.4 Implementation Verification and Validation

This subsection of the Project Implementation Plan describes the process for ensuring that the implementation was executed successfully.

4.2 Acceptance Criteria

This subsection of the Project Implementation Plan establishes the **exit or acceptance criteria** for transitioning the system into production. Identify the criteria that will be used to determine the acceptability of the deliverables as well as any required technical processes, methods, tools, and/ or performance benchmarks required for product acceptance.

SAMPLE

APPENDIX A: Project Implementation Plan Approval

The undersigned acknowledge that they have reviewed the **<Project Name> Implementation Plan** and agree with the information presented within this document. Changes to this **Project Implementation Plan** will be coordinated with, and approved by, the undersigned, or their designated representatives.

Signature: _____ Date: _____

Print Name: _____

Title: _____

Role: _____

Signature: _____ Date: _____

Print Name: _____

Title: _____

Role: _____

Signature: _____ Date: _____

Print Name: _____

Title: _____

Role: _____

Signature: _____ Date: _____

Print Name: _____

Title: _____

Role: _____

SAMPLE

APPENDIX B: System Hardware Inventory

Model	Part Number	FW Version	Physical Location	Maintenance Contract #/ Level of Coverage	Maintenance Period Expiration Date	Required Licenses

SAMPLE



4.0.1.5 Offeror's Experience

Extreme networks

Simplify with Technology

4.0.1.5 Offeror's Experience

PCS has over 30 years of experience delivering advanced network infrastructure solutions to K–12 school districts, higher education institutions, and government agencies throughout the Southeastern United States. Unlike general IT integrators, PCS specializes almost exclusively in network integration and infrastructure projects, allowing our team to excel in complex, time-sensitive deployments that require precision, coordination, and technical depth.

PCS has a strong and proven record of successful projects within the education sector. We are proud to have been awarded the Beaufort County School District contract in 2020 and have maintained an excellent partnership over the past five years, providing reliable, cost-effective, and high-performance networking solutions that support the district's instructional and administrative goals.

Most recently, PCS was awarded the Richland County School District project in South Carolina during the latest E-rate cycle, further demonstrating our leadership and reputation for excellence within the K–12 community. This new partnership builds on our long-standing success in delivering scalable, secure, and high-availability network solutions across South Carolina and neighboring states.

PCS is one of the largest and most highly certified networking integrators in the Southeastern United States. We hold every major technical certification from Extreme Networks and are the only Southeast-based company with Extreme's PartnerWorks certification, which authorizes PCS to handle Tier 1 and Tier 2 support tickets directly on behalf of Extreme Networks. This distinction highlights our unmatched capability to deliver ongoing post-installation support and advanced troubleshooting without delay or escalation barriers.

Beyond our specialization in Extreme Networks, our engineering team possesses extensive expertise across a range of leading network technologies, including HPE/Aruba, Cisco, Juniper, Palo Alto, and Fortinet. This breadth of experience enables PCS to support hybrid environments and to design, implement, and maintain integrated solutions that align with district needs for interoperability, cybersecurity, and manageability.

PCS understands that large-scale networking initiatives require not only technical excellence but also strong project management and communication. Each PCS engagement is led by a dedicated project manager or program manager who oversees scheduling, logistics, and coordination with district stakeholders to ensure projects are

completed on time and within budget. Our engineers are not only experts in deployment, but also trusted advisors who help clients strategize around best practices, long-term scalability, and future growth.

Our long-standing experience in K–12 environments, combined with our certified resources, local presence, and proven project delivery methodology, make PCS the most qualified partner to support the ongoing modernization and expansion of BCSD's network infrastructure.

Project Highlights – K–12 Education Experience

Extreme networks

FY26

DIAMOND ELITE

Partner

PC Solutions and Integration

6480 Via Del Oro / San Jose, CA 95119 / +1-408-579-2800 / ExtremeNetworks.com

LETTER OF AUTHORIZATION

October 30, 2025

Reseller: PC Solutions and Integration
Authorized Territory: United States
Partner Level: Diamond Elite

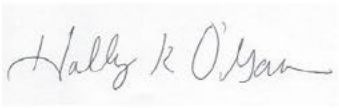
To Whom It May Concern,

This letter confirms that as of the date stated above, the above-identified Reseller is enrolled in Extreme's Partner Program and is authorized to resell Extreme-branded products and services to end-user customers in the above-identified Authorized Territory.

Extreme extends its full, applicable Extreme Networks Products Warranty, found at https://www.extremenetworks.com/support/policies/, for any Extreme-branded Products purchased by you through the Reseller. In addition, Extreme maintenance support offerings are available for purchase for any Extreme-branded Products purchased by you through the Reseller.

If you require additional information, please contact your Extreme channel representative.

Best regards,



Holly O'Gara
Vice President, Americas Channel Sales
Extreme Networks, Inc.
.

Extreme Certifications

partner name	sfdc id	contact name	certification name	certification date	expiration date
PC Solutions and Integration	00180000019PaZQAA0	Andrew Bryan	Extreme Certified Associate in Solutions Selling	2-Oct-23	1-Oct-25
PC Solutions and Integration	00180000019PaZQAA0	Bill Reed	Extreme Hero	31-Dec-24	31-Dec-25
PC Solutions and Integration	00180000019PaZQAA0	Bill Reed	Extreme Switching - Installation and Configuration	18-Jan-23	18-Jan-63
PC Solutions and Integration	00180000019PaZQAA0	Bill Reed	ExtremeWireless Cloud - Installation and Configuration	15-Oct-22	15-Oct-62
PC Solutions and Integration	00180000019PaZQAA0	Chris Gaskin	Campus Fabric - Installation and Configuration	4-Sep-22	4-Sep-62
PC Solutions and Integration	00180000019PaZQAA0	Chris Gaskin	Extreme Certified Associate in Extreme Fabric Connect	6-Oct-23	6-Oct-63
PC Solutions and Integration	00180000019PaZQAA0	Chris Gaskin	Extreme Certified Associate in Extreme Switching	9-Oct-23	9-Oct-63
PC Solutions and Integration	00180000019PaZQAA0	Chris Gaskin	Extreme Certified Associate in ExtremeCloud IQ	6-Oct-23	6-Oct-63
PC Solutions and Integration	00180000019PaZQAA0	Chris Gaskin	Extreme Certified Associate in ExtremeCloud IQ - Site Engine	10-Oct-23	10-Oct-63
PC Solutions and Integration	00180000019PaZQAA0	Chris Gaskin	Extreme Certified Associate in Solutions Design	31-Oct-23	1-Oct-25
PC Solutions and Integration	00180000019PaZQAA0	Chris Gaskin	Extreme Certified Associate in Solutions Selling	31-Oct-23	1-Oct-25
PC Solutions and Integration	00180000019PaZQAA0	Chris Gaskin	Extreme Certified Professional in ExtremeControl	1-Oct-24	1-Oct-27
PC Solutions and Integration	00180000019PaZQAA0	Chris Gaskin	Extreme Certified Professional in Solutions Design	23-Feb-24	23-Feb-27
PC Solutions and Integration	00180000019PaZQAA0	Chris Gaskin	Extreme Certified Professional in Solutions Selling	22-Nov-23	22-Nov-26
PC Solutions and Integration	00180000019PaZQAA0	Chris Gaskin	Extreme Fabric - Installation and Configuration	4-Sep-22	4-Sep-62
PC Solutions and Integration	00180000019PaZQAA0	Chris Gaskin	Extreme Hero	31-Dec-24	31-Dec-25
PC Solutions and Integration	00180000019PaZQAA0	Chris Gaskin	ExtremeControl - Advanced Configuration	26-Sep-24	26-Sep-64
PC Solutions and Integration	00180000019PaZQAA0	Chris Gaskin	ExtremeControl - Installation and Configuration	15-May-23	15-May-63
PC Solutions and Integration	00180000019PaZQAA0	Chris Gaskin	ExtremeControl - Management	26-Sep-24	26-Sep-64
PC Solutions and Integration	00180000019PaZQAA0	Chris Gaskin	ExtremeControl - Troubleshooting	26-Sep-24	26-Sep-64
PC Solutions and Integration	00180000019PaZQAA0	Chris Gaskin	Solutions Design - Demonstrating Value	23-Feb-24	23-Feb-64
PC Solutions and Integration	00180000019PaZQAA0	Chris Gaskin	Solutions Design - Outcome Based Selling	8-Dec-23	8-Dec-63
PC Solutions and Integration	00180000019PaZQAA0	Chris Gaskin	Solutions Design - Product Design	2-Feb-24	2-Feb-64
PC Solutions and Integration	00180000019PaZQAA0	Chris Gaskin	Solutions Design - Technical Proposal	22-Feb-24	22-Feb-64
PC Solutions and Integration	00180000019PaZQAA0	Chris Gaskin	Solutions Selling - Demonstrating Value	7-Nov-23	7-Nov-63
PC Solutions and Integration	00180000019PaZQAA0	Chris Gaskin	Solutions Selling - Extreme Sales Pitch	1-Nov-23	1-Nov-63
PC Solutions and Integration	00180000019PaZQAA0	Chris Gaskin	Solutions Selling - Outcome Based Selling	22-Nov-23	22-Nov-63
PC Solutions and Integration	00180000019PaZQAA0	Chris Gaskin	Solutions Selling - Sales Proposal	7-Nov-23	7-Nov-63
PC Solutions and Integration	00180000019PaZQAA0	Chris Rienhardt	Extreme Champion	31-Dec-24	31-Dec-25
PC Solutions and Integration	00180000019PaZQAA0	Danny Amin	Extreme Certified Associate in ExtremeControl	14-Aug-24	14-Aug-64
PC Solutions and Integration	00180000019PaZQAA0	Danny Amin	Extreme Certified Professional in ExtremeControl	17-Sep-24	17-Sep-27
PC Solutions and Integration	00180000019PaZQAA0	Danny Amin	Extreme Hero	31-Dec-24	31-Dec-25
PC Solutions and Integration	00180000019PaZQAA0	Danny Amin	ExtremeControl - Advanced Configuration	9-Sep-24	9-Sep-64
PC Solutions and Integration	00180000019PaZQAA0	Danny Amin	ExtremeControl - Installation and Configuration	15-May-23	15-May-63
PC Solutions and Integration	00180000019PaZQAA0	Danny Amin	ExtremeControl - Management	9-Sep-24	9-Sep-64
PC Solutions and Integration	00180000019PaZQAA0	Danny Amin	ExtremeControl - Troubleshooting	9-Sep-24	9-Sep-64
PC Solutions and Integration	00180000019PaZQAA0	Danny Amin	ExtremeWireless Cloud - Installation and Configuration	15-Oct-22	15-Oct-62
PC Solutions and Integration	00180000019PaZQAA0	David Paliga	Extreme Certified Associate in Extreme Switching	15-Apr-24	15-Apr-64
PC Solutions and Integration	00180000019PaZQAA0	David Paliga	Extreme Certified Associate in Solutions Design	15-Feb-24	1-Oct-25
PC Solutions and Integration	00180000019PaZQAA0	David Paliga	Extreme Certified Associate in Solutions Selling	15-Feb-24	1-Oct-25
PC Solutions and Integration	00180000019PaZQAA0	David Paliga	Extreme Certified Professional in Solutions Design	27-Feb-24	27-Feb-27
PC Solutions and Integration	00180000019PaZQAA0	David Paliga	Solutions Design - Demonstrating Value	27-Feb-24	27-Feb-64
PC Solutions and Integration	00180000019PaZQAA0	David Paliga	Solutions Design - Outcome Based Selling	15-Feb-24	15-Feb-64
PC Solutions and Integration	00180000019PaZQAA0	David Paliga	Solutions Design - Product Design	22-Jul-23	22-Jul-63
PC Solutions and Integration	00180000019PaZQAA0	David Paliga	Solutions Design - Technical Proposal	25-Jul-23	25-Jul-63
PC Solutions and Integration	00180000019PaZQAA0	David Paliga	Solutions Selling - Demonstrating Value	16-Feb-24	16-Feb-64
PC Solutions and Integration	00180000019PaZQAA0	David Paliga	Solutions Selling - Extreme Sales Pitch	15-Feb-24	15-Feb-64
PC Solutions and Integration	00180000019PaZQAA0	David Paliga	Solutions Selling - Outcome Based Selling	15-Feb-24	15-Feb-64
PC Solutions and Integration	00180000019PaZQAA0	Deepak Dhillon	Extreme Certified Associate in Extreme Fabric Connect	24-Oct-24	24-Oct-64
PC Solutions and Integration	00180000019PaZQAA0	Deepak Dhillon	Extreme Certified Associate in Extreme Switching	25-Oct-24	25-Oct-64
PC Solutions and Integration	00180000019PaZQAA0	Deepak Dhillon	Extreme Certified Associate in ExtremeCloud IQ	30-Oct-24	30-Oct-64
PC Solutions and Integration	00180000019PaZQAA0	Deepak Dhillon	Extreme Certified Associate in ExtremeCloud IQ - Site Engine	31-Oct-24	31-Oct-64
PC Solutions and Integration	00180000019PaZQAA0	Deepak Dhillon	Extreme Certified Associate in ExtremeCloud SD-WAN	24-Jan-25	24-Jan-65
PC Solutions and Integration	00180000019PaZQAA0	Deepak Dhillon	Extreme Certified Associate in ExtremeControl	4-Nov-24	4-Nov-64
PC Solutions and Integration	00180000019PaZQAA0	Deepak Dhillon	Extreme Certified Professional in ExtremeCloud IQ - Controller	12-Feb-25	12-Feb-28
PC Solutions and Integration	00180000019PaZQAA0	Deepak Dhillon	Extreme Networks Associate (XNA) â€“ Introduction to Future Networking	23-Oct-24	23-Oct-34
PC Solutions and Integration	00180000019PaZQAA0	Deepak Dhillon	ExtremeCloud IQ - Controller - Advanced Configuration	27-Jan-25	27-Jan-65

PC Solutions and Integration	00180000019PaZQAA0	Deepak Dhillon	ExtremeCloud IQ - Controller - Installation and Configuration	27-Jan-25	27-Jan-65
PC Solutions and Integration	00180000019PaZQAA0	Deepak Dhillon	ExtremeCloud IQ - Controller - Management	27-Jan-25	27-Jan-65
PC Solutions and Integration	00180000019PaZQAA0	Deepak Dhillon	ExtremeCloud IQ - Controller - Troubleshooting	27-Jan-25	27-Jan-65
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	Extreme Certified Associate in Extreme Fabric Connect	20-Jan-24	20-Jan-64
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	Extreme Certified Associate in Extreme Switching	1-Mar-24	1-Mar-64
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	Extreme Certified Associate in ExtremeCloud IQ	8-Nov-23	8-Nov-63
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	Extreme Certified Associate in ExtremeCloud SD-WAN	20-Aug-24	20-Aug-64
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	Extreme Certified Associate in Solutions Design	8-Feb-24	1-Oct-25
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	Extreme Certified Associate in Solutions Selling	2-Dec-24	2-Dec-25
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	Extreme Certified Professional in ExtremeCloud IQ - Controller	12-Feb-25	12-Feb-28
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	Extreme Certified Professional in ExtremeCloud IQ - Site Engine	10-Dec-24	10-Dec-27
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	Extreme Certified Professional in ExtremeWireless Cloud	1-Nov-24	1-Nov-27
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	Extreme Certified Professional in Solutions Design	1-Mar-24	1-Mar-27
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	Extreme Certified Professional in Solutions Selling	3-Dec-24	3-Dec-27
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	Extreme Hero	31-Dec-24	31-Dec-25
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	ExtremeCloud IQ - Controller - Advanced Configuration	28-Jan-25	28-Jan-65
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	ExtremeCloud IQ - Controller - Installation and Configuration	28-Jan-25	28-Jan-65
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	ExtremeCloud IQ - Controller - Management	28-Jan-25	28-Jan-65
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	ExtremeCloud IQ - Controller - Troubleshooting	28-Jan-25	28-Jan-65
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	ExtremeCloud IQ - Site Engine - Advanced Configuration	28-Oct-24	28-Oct-64
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	ExtremeCloud IQ - Site Engine - Installation and Configuration	28-Oct-24	28-Oct-64
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	ExtremeCloud IQ - Site Engine - Management	28-Oct-24	28-Oct-64
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	ExtremeCloud IQ - Site Engine - Troubleshooting	28-Oct-24	28-Oct-64
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	ExtremeWireless Cloud - Advanced Configuration	31-Oct-24	31-Oct-64
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	ExtremeWireless Cloud - Installation and Configuration	15-Oct-22	15-Oct-62
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	ExtremeWireless Cloud - Management	31-Oct-24	31-Oct-64
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	ExtremeWireless Cloud - Troubleshooting	31-Oct-24	31-Oct-64
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	Solutions Design - Demonstrating Value	6-Feb-24	6-Feb-64
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	Solutions Design - Outcome Based Selling	6-Feb-24	6-Feb-64
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	Solutions Design - Product Design	29-Feb-24	29-Feb-64
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	Solutions Design - Technical Proposal	29-Feb-24	29-Feb-64
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	Solutions Selling - Demonstrating Value	3-Dec-24	3-Dec-64
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	Solutions Selling - Extreme Sales Pitch	3-Dec-24	3-Dec-64
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	Solutions Selling - Outcome Based Selling	6-Feb-24	6-Feb-64
PC Solutions and Integration	00180000019PaZQAA0	Emanuel Torres	Solutions Selling - Sales Proposal	3-Dec-24	3-Dec-64
PC Solutions and Integration	00180000019PaZQAA0	Jason Morales	Solutions Design - Product Design	9-May-23	9-May-63
PC Solutions and Integration	00180000019PaZQAA0	Jim Strain	ECS - Data Center VDX â€“ VCS Fabric Configuration and Implementation	5-Mar-23	31-Dec-28
PC Solutions and Integration	00180000019PaZQAA0	John Boyce	Extreme Certified Associate in Extreme Fabric Connect	12-Mar-24	12-Mar-64
PC Solutions and Integration	00180000019PaZQAA0	John Boyce	Extreme Certified Associate in Solutions Design	22-Feb-24	1-Oct-25
PC Solutions and Integration	00180000019PaZQAA0	John Boyce	Extreme Certified Professional in Solutions Design	11-Mar-24	11-Mar-27
PC Solutions and Integration	00180000019PaZQAA0	John Boyce	Extreme Networks Associate (XNA) â€“ Building Secure and Robust Wireless Networks	20-Dec-23	20-Dec-33
PC Solutions and Integration	00180000019PaZQAA0	John Boyce	Extreme Networks Associate (XNA) â€“ Introduction to Future Networking	18-Dec-23	18-Dec-33
PC Solutions and Integration	00180000019PaZQAA0	John Boyce	Solutions Design - Demonstrating Value	7-Mar-24	7-Mar-64
PC Solutions and Integration	00180000019PaZQAA0	John Boyce	Solutions Design - Outcome Based Selling	8-Mar-24	8-Mar-64
PC Solutions and Integration	00180000019PaZQAA0	John Boyce	Solutions Design - Product Design	27-Feb-24	27-Feb-64
PC Solutions and Integration	00180000019PaZQAA0	John Boyce	Solutions Design - Technical Proposal	11-Mar-24	11-Mar-64
PC Solutions and Integration	00180000019PaZQAA0	John Boyce	Solutions Selling - Outcome Based Selling	8-Mar-24	8-Mar-64
PC Solutions and Integration	00180000019PaZQAA0	Jose Rodriguez	Extreme Certified Associate in Extreme Fabric Connect	17-Jan-24	17-Jan-64
PC Solutions and Integration	00180000019PaZQAA0	Jose Rodriguez	Extreme Certified Associate in Extreme Switching	31-Oct-23	31-Oct-63
PC Solutions and Integration	00180000019PaZQAA0	Jose Rodriguez	Extreme Certified Associate in ExtremeCloud IQ	31-Oct-23	31-Oct-63
PC Solutions and Integration	00180000019PaZQAA0	Jose Rodriguez	Extreme Certified Associate in Solutions Design	31-Oct-23	1-Oct-25
PC Solutions and Integration	00180000019PaZQAA0	Jose Rodriguez	Extreme Certified Associate in Solutions Selling	6-Feb-24	1-Oct-25
PC Solutions and Integration	00180000019PaZQAA0	Jose Rodriguez	Extreme Certified Professional in Extreme Switching	1-Jul-24	1-Jul-27
PC Solutions and Integration	00180000019PaZQAA0	Jose Rodriguez	Extreme Certified Professional in ExtremeCloud IQ - Site Engine	9-Sep-24	9-Sep-27
PC Solutions and Integration	00180000019PaZQAA0	Jose Rodriguez	Extreme Certified Professional in ExtremeWireless Cloud	30-Apr-24	30-Apr-27
PC Solutions and Integration	00180000019PaZQAA0	Jose Rodriguez	Extreme Certified Professional in Solutions Design	1-Mar-24	1-Mar-27
PC Solutions and Integration	00180000019PaZQAA0	Jose Rodriguez	Extreme Fabric - Installation and Configuration	4-Sep-22	4-Sep-62
PC Solutions and Integration	00180000019PaZQAA0	Jose Rodriguez	Extreme Hero	31-Dec-24	31-Dec-25

PC Solutions and Integration	00180000019PaZQAA0	Jose Rodriguez	Extreme Switching - Installation and Configuration	4-Apr-24	4-Apr-64
PC Solutions and Integration	00180000019PaZQAA0	Jose Rodriguez	Extreme Switching - Management	4-Apr-24	4-Apr-64
PC Solutions and Integration	00180000019PaZQAA0	Jose Rodriguez	Extreme Switching - Troubleshooting	4-Apr-24	4-Apr-64
PC Solutions and Integration	00180000019PaZQAA0	Jose Rodriguez	ExtremeCloud IQ - Site Engine - Advanced Configuration	22-Aug-24	22-Aug-64
PC Solutions and Integration	00180000019PaZQAA0	Jose Rodriguez	ExtremeCloud IQ - Site Engine - Installation and Configuration	16-Nov-22	16-Nov-62
PC Solutions and Integration	00180000019PaZQAA0	Jose Rodriguez	ExtremeCloud IQ - Site Engine - Management	22-Aug-24	22-Aug-64
PC Solutions and Integration	00180000019PaZQAA0	Jose Rodriguez	ExtremeCloud IQ - Site Engine - Troubleshooting	22-Aug-24	22-Aug-64
PC Solutions and Integration	00180000019PaZQAA0	Jose Rodriguez	ExtremeWireless Cloud - Installation and Configuration	15-Oct-22	15-Oct-62
PC Solutions and Integration	00180000019PaZQAA0	Jose Rodriguez	Solutions Design - Demonstrating Value	6-Feb-24	6-Feb-64
PC Solutions and Integration	00180000019PaZQAA0	Jose Rodriguez	Solutions Design - Outcome Based Selling	6-Feb-24	6-Feb-64
PC Solutions and Integration	00180000019PaZQAA0	Jose Rodriguez	Solutions Design - Product Design	1-Mar-24	1-Mar-64
PC Solutions and Integration	00180000019PaZQAA0	Jose Rodriguez	Solutions Design - Technical Proposal	1-Mar-24	1-Mar-64
PC Solutions and Integration	00180000019PaZQAA0	Jose Rodriguez	Solutions Selling - Extreme Sales Pitch	6-Feb-24	6-Feb-64
PC Solutions and Integration	00180000019PaZQAA0	Jose Rodriguez	Solutions Selling - Outcome Based Selling	6-Feb-24	6-Feb-64
PC Solutions and Integration	00180000019PaZQAA0	Josh Reichmann	Extreme Certified Associate in Extreme Switching	5-Apr-23	5-Apr-63
PC Solutions and Integration	00180000019PaZQAA0	Josh Reichmann	Extreme Certified Associate in ExtremeControl	21-Aug-24	21-Aug-64
PC Solutions and Integration	00180000019PaZQAA0	Keila Crimmins	Extreme Champion	31-Dec-24	31-Dec-25
PC Solutions and Integration	00180000019PaZQAA0	Kim Palmer	Extreme Champion	31-Dec-24	31-Dec-25
PC Solutions and Integration	00180000019PaZQAA0	Mario Cepero	Extreme Certified Associate in Extreme Fabric Connect	11-Oct-24	11-Oct-64
PC Solutions and Integration	00180000019PaZQAA0	Mario Cepero	Extreme Certified Associate in Solutions Design	12-Mar-24	1-Oct-25
PC Solutions and Integration	00180000019PaZQAA0	Mario Cepero	Extreme Certified Professional in Extreme Fabric	27-Nov-24	27-Nov-27
PC Solutions and Integration	00180000019PaZQAA0	Mario Cepero	Extreme Certified Professional in Solutions Design	27-Apr-24	27-Apr-27
PC Solutions and Integration	00180000019PaZQAA0	Mario Cepero	Extreme Fabric - Advanced Configuration	15-Oct-24	15-Oct-64
PC Solutions and Integration	00180000019PaZQAA0	Mario Cepero	Extreme Fabric - Installation and Configuration	15-Oct-24	15-Oct-64
PC Solutions and Integration	00180000019PaZQAA0	Mario Cepero	Extreme Fabric - Management	15-Oct-24	15-Oct-64
PC Solutions and Integration	00180000019PaZQAA0	Mario Cepero	Extreme Fabric - Troubleshooting	15-Oct-24	15-Oct-64
PC Solutions and Integration	00180000019PaZQAA0	Mario Cepero	Solutions Design - Demonstrating Value	27-Apr-24	27-Apr-64
PC Solutions and Integration	00180000019PaZQAA0	Mario Cepero	Solutions Design - Outcome Based Selling	27-Apr-24	27-Apr-64
PC Solutions and Integration	00180000019PaZQAA0	Mario Cepero	Solutions Design - Product Design	26-Apr-24	26-Apr-64
PC Solutions and Integration	00180000019PaZQAA0	Mario Cepero	Solutions Design - Technical Proposal	26-Apr-24	26-Apr-64
PC Solutions and Integration	00180000019PaZQAA0	Mario Cepero	Solutions Selling - Outcome Based Selling	27-Apr-24	27-Apr-64
PC Solutions and Integration	00180000019PaZQAA0	Michael Langford	ECS â€“ ExtremeNAC	14-Jul-23	31-Jul-25
PC Solutions and Integration	00180000019PaZQAA0	Michael Langford	Extreme Certified Associate in Extreme Fabric Connect	18-Jul-23	18-Jul-63
PC Solutions and Integration	00180000019PaZQAA0	Michael Langford	Extreme Certified Associate in Extreme Switching	18-Jul-23	18-Jul-63
PC Solutions and Integration	00180000019PaZQAA0	Michael Langford	Extreme Certified Associate in ExtremeCloud IQ	18-Jul-23	18-Jul-63
PC Solutions and Integration	00180000019PaZQAA0	Michael Langford	Extreme Certified Associate in ExtremeCloud IQ - Site Engine	18-Jul-23	18-Jul-63
PC Solutions and Integration	00180000019PaZQAA0	Michael Langford	Extreme Certified Associate in ExtremeControl	1-Nov-23	1-Nov-63
PC Solutions and Integration	00180000019PaZQAA0	Michael Langford	Extreme Certified Associate in Solutions Design	12-Dec-23	1-Oct-25
PC Solutions and Integration	00180000019PaZQAA0	Michael Langford	Extreme Certified Associate in Solutions Selling	1-Nov-23	1-Oct-25
PC Solutions and Integration	00180000019PaZQAA0	Michael Langford	Extreme Certified Professional in ExtremeCloud IQ - Controller	31-May-24	31-May-27
PC Solutions and Integration	00180000019PaZQAA0	Michael Langford	Extreme Certified Professional in Solutions Design	28-Feb-24	28-Feb-27
PC Solutions and Integration	00180000019PaZQAA0	Michael Langford	Extreme Certified Professional in Solutions Selling	22-Nov-23	22-Nov-26
PC Solutions and Integration	00180000019PaZQAA0	Michael Langford	Extreme Fabric - Installation and Configuration	5-Sep-22	5-Sep-62
PC Solutions and Integration	00180000019PaZQAA0	Michael Langford	ExtremeCloud IQ - Controller - Advanced Configuration	4-Mar-23	4-Mar-63
PC Solutions and Integration	00180000019PaZQAA0	Michael Langford	ExtremeCloud IQ - Controller - Installation and Configuration	6-Mar-23	6-Mar-63
PC Solutions and Integration	00180000019PaZQAA0	Michael Langford	ExtremeCloud IQ - Controller - Management	6-Mar-23	6-Mar-63
PC Solutions and Integration	00180000019PaZQAA0	Michael Langford	ExtremeCloud IQ - Controller - Troubleshooting	6-Mar-23	6-Mar-63
PC Solutions and Integration	00180000019PaZQAA0	Michael Langford	ExtremeCloud IQ - Site Engine - Installation and Configuration	16-Nov-22	16-Nov-62
PC Solutions and Integration	00180000019PaZQAA0	Michael Langford	ExtremeControl - Installation and Configuration	15-May-23	15-May-63
PC Solutions and Integration	00180000019PaZQAA0	Michael Langford	ExtremeWireless Cloud - Installation and Configuration	15-Oct-22	15-Oct-62
PC Solutions and Integration	00180000019PaZQAA0	Michael Langford	Solutions Design - Demonstrating Value	28-Feb-24	28-Feb-64
PC Solutions and Integration	00180000019PaZQAA0	Michael Langford	Solutions Design - Outcome Based Selling	8-Dec-23	8-Dec-63
PC Solutions and Integration	00180000019PaZQAA0	Michael Langford	Solutions Design - Product Design	2-Feb-24	2-Feb-64
PC Solutions and Integration	00180000019PaZQAA0	Michael Langford	Solutions Design - Technical Proposal	28-Feb-24	28-Feb-64
PC Solutions and Integration	00180000019PaZQAA0	Michael Langford	Solutions Selling - Demonstrating Value	7-Nov-23	7-Nov-63
PC Solutions and Integration	00180000019PaZQAA0	Michael Langford	Solutions Selling - Extreme Sales Pitch	1-Nov-23	1-Nov-63
PC Solutions and Integration	00180000019PaZQAA0	Michael Langford	Solutions Selling - Outcome Based Selling	22-Nov-23	22-Nov-63
PC Solutions and Integration	00180000019PaZQAA0	Michael Langford	Solutions Selling - Sales Proposal	7-Nov-23	7-Nov-63

PC Solutions and Integration	00180000019PaZQAA0	Michael Lunde	ECS - ExtremeWireless Core	15-Feb-23	3-Oct-26
PC Solutions and Integration	00180000019PaZQAA0	Michael Lunde	Extreme Fabric - Installation and Configuration	4-Sep-22	4-Sep-62
PC Solutions and Integration	00180000019PaZQAA0	Michael Lunde	Extreme Hero	31-Dec-24	31-Dec-25
PC Solutions and Integration	00180000019PaZQAA0	Michael Lunde	Extreme Switching - Installation and Configuration	18-Jan-23	18-Jan-63
PC Solutions and Integration	00180000019PaZQAA0	Michael Lunde	ExtremeCloud IQ - Site Engine - Installation and Configuration	16-Nov-22	16-Nov-62
PC Solutions and Integration	00180000019PaZQAA0	Michael Lunde	ExtremeControl - Installation and Configuration	15-May-23	15-May-63
PC Solutions and Integration	00180000019PaZQAA0	Rebekah Boone	Extreme Certified Associate in Solutions Selling	2-Dec-24	2-Dec-25
PC Solutions and Integration	00180000019PaZQAA0	Rebekah Boone	Extreme Certified Professional in Solutions Selling	4-Dec-24	4-Dec-27
PC Solutions and Integration	00180000019PaZQAA0	Rebekah Boone	Extreme Champion	31-Dec-24	31-Dec-25
PC Solutions and Integration	00180000019PaZQAA0	Rebekah Boone	Solutions Design - Outcome Based Selling	4-Dec-24	4-Dec-64
PC Solutions and Integration	00180000019PaZQAA0	Rebekah Boone	Solutions Selling - Demonstrating Value	4-Dec-24	4-Dec-64
PC Solutions and Integration	00180000019PaZQAA0	Rebekah Boone	Solutions Selling - Extreme Sales Pitch	2-Dec-24	2-Dec-64
PC Solutions and Integration	00180000019PaZQAA0	Rebekah Boone	Solutions Selling - Outcome Based Selling	4-Dec-24	4-Dec-64
PC Solutions and Integration	00180000019PaZQAA0	Rebekah Boone	Solutions Selling - Sales Proposal	3-Dec-24	3-Dec-64
PC Solutions and Integration	00180000019PaZQAA0	Richard Woodward	Extreme Certified Associate in Solutions Design	2-Mar-24	1-Oct-25
PC Solutions and Integration	00180000019PaZQAA0	Richard Woodward	Extreme Certified Professional in Solutions Design	12-Mar-24	12-Mar-27
PC Solutions and Integration	00180000019PaZQAA0	Richard Woodward	Solutions Design - Demonstrating Value	12-Mar-24	12-Mar-64
PC Solutions and Integration	00180000019PaZQAA0	Richard Woodward	Solutions Design - Outcome Based Selling	12-Mar-24	12-Mar-64
PC Solutions and Integration	00180000019PaZQAA0	Richard Woodward	Solutions Design - Product Design	7-Mar-24	7-Mar-64
PC Solutions and Integration	00180000019PaZQAA0	Richard Woodward	Solutions Design - Technical Proposal	12-Mar-24	12-Mar-64
PC Solutions and Integration	00180000019PaZQAA0	Richard Woodward	Solutions Selling - Outcome Based Selling	12-Mar-24	12-Mar-64
PC Solutions and Integration	00180000019PaZQAA0	Robert Boush	ECS - Data Center VDX â€“ VCS Fabric Configuration and Implementation	5-Mar-23	31-Dec-28
PC Solutions and Integration	00180000019PaZQAA0	Robert Boush	Extreme Certified Associate in Solutions Selling	4-Dec-24	4-Dec-25
PC Solutions and Integration	00180000019PaZQAA0	Robert Boush	Extreme Certified Professional in Solutions Selling	4-Dec-24	4-Dec-27
PC Solutions and Integration	00180000019PaZQAA0	Robert Boush	Solutions Design - Outcome Based Selling	4-Dec-24	4-Dec-64
PC Solutions and Integration	00180000019PaZQAA0	Robert Boush	Solutions Selling - Demonstrating Value	4-Dec-24	4-Dec-64
PC Solutions and Integration	00180000019PaZQAA0	Robert Boush	Solutions Selling - Extreme Sales Pitch	4-Dec-24	4-Dec-64
PC Solutions and Integration	00180000019PaZQAA0	Robert Boush	Solutions Selling - Outcome Based Selling	4-Dec-24	4-Dec-64
PC Solutions and Integration	00180000019PaZQAA0	Robert Boush	Solutions Selling - Sales Proposal	4-Dec-24	4-Dec-64
PC Solutions and Integration	00180000019PaZQAA0	Tim Walsh	Extreme Champion	31-Dec-24	31-Dec-25
PC Solutions and Integration	00180000019PaZQAA0	Todd Longeway	Extreme Champion	31-Dec-24	31-Dec-25
PC Solutions and Integration	00180000019PaZQAA0	Vishal Nanda	Extreme Certified Associate in Solutions Design	28-Sep-23	1-Oct-25
PC Solutions and Integration	00180000019PaZQAA0	Vishal Nanda	Extreme Champion	31-Dec-24	31-Dec-25
PC Solutions and Integration	00180000019PaZQAA0	William Martinez	Extreme Certified Associate in Extreme Fabric Connect	28-Sep-23	28-Sep-63
PC Solutions and Integration	00180000019PaZQAA0	William Martinez	Extreme Certified Associate in Extreme Switching	14-Mar-24	14-Mar-64
PC Solutions and Integration	00180000019PaZQAA0	William Martinez	Extreme Certified Associate in ExtremeCloud IQ - Site Engine	2-Nov-24	2-Nov-64
PC Solutions and Integration	00180000019PaZQAA0	William Martinez	Extreme Certified Associate in ExtremeControl	14-Aug-24	14-Aug-64
PC Solutions and Integration	00180000019PaZQAA0	William Martinez	Extreme Certified Associate in Solutions Design	29-Sep-23	1-Oct-25
PC Solutions and Integration	00180000019PaZQAA0	William Martinez	Extreme Certified Professional in Extreme Fabric	28-Mar-24	28-Mar-27
PC Solutions and Integration	00180000019PaZQAA0	William Martinez	Extreme Certified Professional in Extreme Switching	1-Jul-24	1-Jul-27
PC Solutions and Integration	00180000019PaZQAA0	William Martinez	Extreme Certified Professional in ExtremeControl	11-Sep-24	11-Sep-27
PC Solutions and Integration	00180000019PaZQAA0	William Martinez	Extreme Certified Professional in Solutions Design	1-Mar-24	1-Mar-27
PC Solutions and Integration	00180000019PaZQAA0	William Martinez	Extreme Fabric - Advanced Configuration	13-Mar-24	13-Mar-64
PC Solutions and Integration	00180000019PaZQAA0	William Martinez	Extreme Fabric - Installation and Configuration	4-Sep-22	4-Sep-62
PC Solutions and Integration	00180000019PaZQAA0	William Martinez	Extreme Fabric - Management	14-Mar-24	14-Mar-64
PC Solutions and Integration	00180000019PaZQAA0	William Martinez	Extreme Fabric - Troubleshooting	13-Mar-24	13-Mar-64
PC Solutions and Integration	00180000019PaZQAA0	William Martinez	Extreme Hero	31-Dec-24	31-Dec-25
PC Solutions and Integration	00180000019PaZQAA0	William Martinez	Extreme Switching - Advanced Configuration	27-Mar-24	27-Mar-64
PC Solutions and Integration	00180000019PaZQAA0	William Martinez	Extreme Switching - Installation and Configuration	27-Mar-24	27-Mar-64
PC Solutions and Integration	00180000019PaZQAA0	William Martinez	Extreme Switching - Management	21-Jun-24	21-Jun-64
PC Solutions and Integration	00180000019PaZQAA0	William Martinez	Extreme Switching - Troubleshooting	27-Mar-24	27-Mar-64
PC Solutions and Integration	00180000019PaZQAA0	William Martinez	ExtremeCloud IQ - Site Engine - Advanced Configuration	5-Nov-24	5-Nov-64
PC Solutions and Integration	00180000019PaZQAA0	William Martinez	ExtremeCloud IQ - Site Engine - Installation and Configuration	5-Nov-24	5-Nov-64
PC Solutions and Integration	00180000019PaZQAA0	William Martinez	ExtremeCloud IQ - Site Engine - Management	5-Nov-24	5-Nov-64
PC Solutions and Integration	00180000019PaZQAA0	William Martinez	ExtremeCloud IQ - Site Engine - Troubleshooting	5-Nov-24	5-Nov-64
PC Solutions and Integration	00180000019PaZQAA0	William Martinez	ExtremeControl - Installation and Configuration	23-Aug-24	23-Aug-64
PC Solutions and Integration	00180000019PaZQAA0	William Martinez	ExtremeControl - Management	23-Aug-24	23-Aug-64
PC Solutions and Integration	00180000019PaZQAA0	William Martinez	Solutions Design - Demonstrating Value	5-Feb-24	5-Feb-64

PC Solutions and Integration	00180000019PaZQAA0	William Martinez	Solutions Design - Outcome Based Selling	1-Mar-24	1-Mar-64
PC Solutions and Integration	00180000019PaZQAA0	William Martinez	Solutions Design - Product Design	9-Nov-23	9-Nov-63
PC Solutions and Integration	00180000019PaZQAA0	William Martinez	Solutions Design - Technical Proposal	1-Mar-24	1-Mar-64
PC Solutions and Integration	00180000019PaZQAA0	William Martinez	Solutions Selling - Outcome Based Selling	1-Mar-24	1-Mar-64

Bid Bond

PCS acknowledges the requirements in Section 7.1.19 of the RFP regarding Performance Bonds and Labor and Material Payment Bonds. PCS confirms that we will provide **100% Performance and Labor & Material Payment Bonds** for any project or task order issued under this contract that exceeds **$50,000**, as required by Beaufort County School District.

PCS further agrees that each bond will be issued by a **surety company licensed in the State of South Carolina**, holding a minimum "A" rating in the most current edition of the *Best's Key Rating Guide – Property & Liability*, and demonstrating financial strength of at least **five (5) times the contract amount**, as required. Each bond will be accompanied by a valid **Power of Attorney** authorizing the attorney-in-fact to bind the surety.

November 12, 2025

RE: PC SOLUTIONS & INTEGRATION, INC.

Form **W-9**
(Rev. March 2024)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

Go to *www.irs.gov/FormW9* for instructions and the latest information.

Give form to the requester. Do not send to the IRS.

Before you begin. For guidance related to the purpose of Form W-9, see *Purpose of Form*, below.

Print or type. See ***Specific Instructions*** on page 3.

1 Name of entity/individual. An entry is required. (For a sole proprietor or disregarded entity, enter the owner's name on line 1, and enter the business/disregarded entity's name on line 2.)

2 Business name/disregarded entity name, if different from above.

3a Check the appropriate box for federal tax classification of the entity/individual whose name is entered on line 1. Check only **one** of the following seven boxes.

☐ Individual/sole proprietor ☐ C corporation ☑ S corporation ☐ Partnership ☐ Trust/estate

☐ LLC. Enter the tax classification (C = C corporation, S = S corporation, P = Partnership) . . . .

Note: Check the "LLC" box above and, in the entry space, enter the appropriate code (C, S, or P) for the tax classification of the LLC, unless it is a disregarded entity. A disregarded entity should instead check the appropriate box for the tax classification of its owner.

☐ Other (see instructions)

3b If on line 3a you checked "Partnership" or "Trust/estate," or checked "LLC" and entered "P" as its tax classification, and you are providing this form to a partnership, trust, or estate in which you have an ownership interest, check this box if you have any foreign partners, owners, or beneficiaries. See instructions . . . . . ☐

4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3):

Exempt payee code (if any)

Exemption from Foreign Account Tax Compliance Act (FATCA) reporting code (if any)

(Applies to accounts maintained outside the United States.)

5 Address (number, street, and apt. or suite no.). See instructions.

Requester's name and address (optional)

6 City, state, and ZIP

7 List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the instructions for Part I, later. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN*, later.

Note: If the account is in more than one name, see the instructions for line 1. See also *What Name and Number To Give the Requester* for guidelines on whose number to enter.

Social security number

			–		–				

or

Employer identification number

		–							

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
2. I am not subject to backup withholding because (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
3. I am a U.S. citizen or other U.S. person (defined below); and
4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and, generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions for Part II, later.

Sign Here **Signature of U.S. person** natasha rolle **Date** 02/10/2025

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. For the latest information about developments related to Form W-9 and its instructions, such as legislation enacted after they were published, go to *www.irs.gov/FormW9*.

What's New

Line 3a has been modified to clarify how a disregarded entity completes this line. An LLC that is a disregarded entity should check the appropriate box for the tax classification of its owner. Otherwise, it should check the "LLC" box and enter its appropriate tax classification.

New line 3b has been added to this form. A flow-through entity is required to complete this line to indicate that it has direct or indirect foreign partners, owners, or beneficiaries when it provides the Form W-9 to another flow-through entity in which it has an ownership interest. This change is intended to provide a flow-through entity with information regarding the status of its indirect foreign partners, owners, or beneficiaries, so that it can satisfy any applicable reporting requirements. For example, a partnership that has any indirect foreign partners may be required to complete Schedules K-2 and K-3. See the Partnership Instructions for Schedules K-2 and K-3 (Form 1065).

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS is giving you this form because they



4.0.1.6 Personnel Staffing

4.0.1.6 Personnel Staffing

PCS takes pride in maintaining an engineering-driven organization with a strong, experienced, and certified team dedicated to delivering exceptional network design, deployment, and support services. Our staff-to-role balance is deliberately structured to ensure that technical expertise drives every phase of a project, from design to installation to ongoing maintenance.

PCS employs more engineers than sales staff, emphasizing our philosophy that true partnership is built through technical competency, responsiveness, and reliability. The following personnel will serve as the primary team for Beaufort County School District's Network Electronics Systems and Services project.

Each team member brings extensive experience in K–12 environments and a deep understanding of both Extreme Networks solutions and the unique operational needs of school districts.

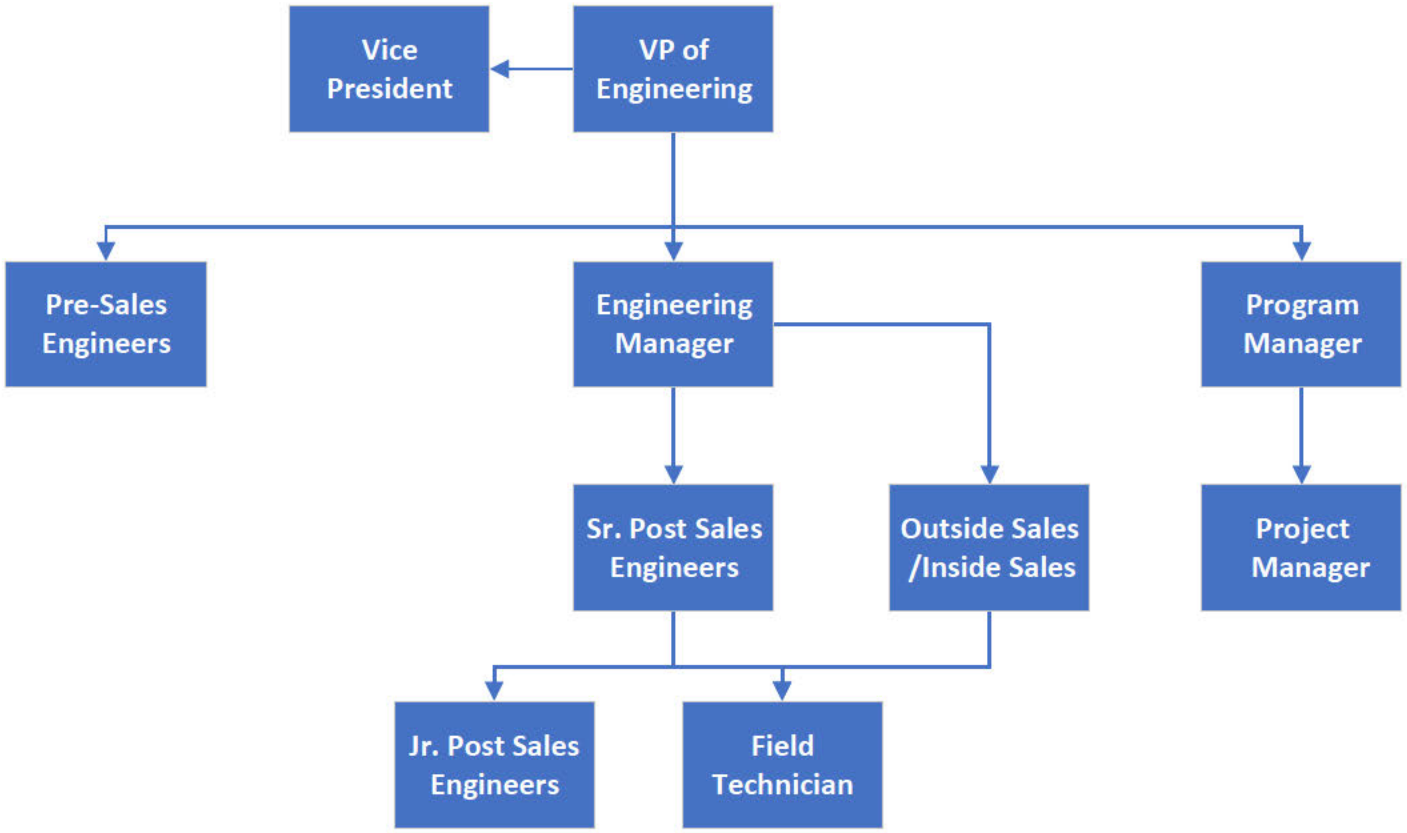
Key Project Personnel

Name & Title	Role / Responsibilities	Contact Information

Team Strength and Expertise

- **Certified Experts:** PCS engineers hold the highest levels of certification from **Extreme Networks**, including *Extreme Certified Specialist*, *Extreme Certified Expert*, and *Enterprise Network Master* designations.
- **E-rate Expertise:** Experienced in E-rate project planning, procurement, and post-implementation documentation.
- **Education-Focused:** Every member of the PCS project team has direct experience supporting K–12 environments, ensuring an understanding of instructional schedules, security needs, and deployment logistics unique to school settings.
- **Dedicated Support Model:** PCS maintains a Help Desk and Network Operations Center that provide responsive support for all client districts, ensuring fast resolution and minimal downtime.

Organizational Chart
Pre-Sales | Post-Sales | Support



Organizational Chart Title Responsibilities

VP of Engineering:

Director of Engineering – Provides level "C" interaction between executives, engineering, and sales to understand technology goals, map technology for ultimate success and fosters constant communication between the team to ensure understanding and top-notch support to the customer. This position has a strong knowledge base of all systems and equipment and the items that would work best for the customer according to their expected outcome.

Pre-Sales Engineers:

CISO/Sr. Network Security Engineer – Plans, designs and provides highly available and secure networks for SLED and Enterprise Organizations. This individual is highly qualified to design and coordinate the implementation of SLED and Enterprise data, voice, and video networks. The CISO works closely with key individuals within to build, produce and integrate the vision of customers to best suite the needs of districts, schools and government agencies.

Engineering Manager:

IT Services Manager - Provides leadership and guidance to IT service staff and customers. Working closely with Engineers, customers, and vendors to ensure equipment delivery, installation and maintenance of IT services and infrastructure. Ensures the performance, availability, security, and quality of IT services and systems.

Program Manager/Project Manager:

Sr. Project Manager - Ensures the successful outcomes of varied IT projects through planning, organization, and cross functional integration.

Sr. Post Sales Engineers:

Senior Network Engineer - Works closely with the CISO, Director of Engineering and Sales Account associates to design and deploy enterprise wired/wireless and NAC solutions. The Sr. Network Engineer is engaged and responsible for completing projects starting with scope of work reviews, customer design validation, project data collection, equipment staging, configuration, implementation, and testing.

Outside Sales:

Senior Account Manager – Provides network consulting and design assistance for Government and Education entities, while customizing technology solutions to customer needs. Ensures customer satisfaction and provides solutions to meet and exceed customer needs.

Helpdesk/Support:

Inside Account Manager - Develops and maintains a sustainable solid relationship with clients to provide assistance with equipment needed, orders processed, installation and any issues that arise.



4.0.1.7 Section 8 - Attachments

4.1 Response Form

PCS complies and acknowledges the terms in 4.1.

4.1.1 This “Section 4.1 - Response Form” must be filled out in its entirety either typed or printed neatly in ink for each System proposed.

4.1.2 An officer of the proposing entity or other person authorized to bind the Offeror in this matter must sign all proposal copies in permanent BLUE ink.

4.1.3 Failure to answer any questions, or provide information required in the proposal document may subject the entire proposal to rejection. Questions concerning capabilities that cannot be provided by the proposed system must be responded to with the answer "not available", "not applicable", or other appropriate statements. Cross-references to other documents, URL’s, etc., as answers to the proposal document's questions are not acceptable. The inability to meet a required feature or service may not invalidate the proposal but will be weighed in the final evaluation.

4.1.4 Offeror is required to point out those services, equipment, and features which cannot be provided and Contract conditions which cannot be met. These must be indicated in a separate document entitled “Exceptions/Qualifications”.

4.1.5 If alternatives to specified services, features, or contract conditions are available, which in the Offeror’s opinion may accomplish the same purpose, then details of the alternative may be included on a separate attachment entitled “Alternatives”.

4.1.6 In the event the Offeror believes it can offer services, features, or contract conditions that may be more favorable to BCSD than those set forth in this document, or has new solutions or features to offer, please submit a description of those items with the proposal response in a section entitled “VALUE ENGINEERING” (4.11). Such services and conditions will be considered in evaluating the proposal. This, however, does not relieve the Offeror from adhering to the specifications in the base proposal.

Hours of operation: 8AM - 6PM

Toll free number:

4.2.3 Number of installation and maintenance personnel in local service center (clarify quantity by technology system):
PCS: 2 – wired, wireless, security; Extreme: 200+ support all Extreme Solutions

Number of installation personnel trained on the systems proposed (clarify quantity by technology system):
PCS: 14 – switching, wireless, and Extreme Management Suite, XMC, Control, and Analytics. Security trained engineering as well.

Number of maintenance/support personnel trained on the systems proposed (clarify quantity by technology system):
PCS: Same as above; Extreme: Over 150 technicians work for Extreme's Global Technical Assistance Center (GTAC) in the US.

(If the same personnel conduct maintenance, installation and add/moves, fill in only one of the responses above and mark "same" for the subsequent responses.)

For what wired and wireless systems do you maintain certified staff members?
Extreme Networks, Aruba, Cisco, and Juniper/Mist

4.2.4 How large an area does your maintenance/support force cover?
PCS: The Southeastern United States. PCS has completed many national projects as well. Extreme's maintenance/support force supports customers globally.

4.2.5 Describe the organization of the installation department. An attached organization chart will suffice.
Please see attached organizational chart in section 4.0.1.6 personnel staffing.

4.2.6 Describe the organization of the maintenance/support department (an attached organization chart will suffice):
Extreme's regional depot for parts stocking closest to the District is located in Louisville, KY. Extreme has four-hour US parts shipments with over 63 depots in the US and call centers globally providing 100% in-house support from tenured Extreme employees. Additionally, Extreme is recognized for having the industry's best service and support.

4.2.7 Do you plan to subcontract any portion or all the System installation? If so, who would perform the work? If so, please provide all information identified in the RFP and Response requirements. Explain, if all or partially subcontracted:
PCS plans to perform systems installation work internally, but depending on timeline of installation, PCS will possibly use subcontractors as "smart hands" for rack and stack.

Name and address of Subcontractor and specify the work to be performed:

TBD

4.2.8 Our SPIN # is: _____

4.2.9 Do you have full time sales and support resources that physically reside within 300 miles of Beaufort, SC? If no, explain. Yes, we have sales and support within 300 miles.

4.2.10 Do you understand and agree to comply with the Lowest Corresponding Price (LCP) requirement as specified in 3.0.8 and 3.17.5. If no, explain. Yes

4.2.11 Do you understand that Contractor must assist BCSD staff and BCSD's E-rate consultant in timely meeting all E-rate deadlines by producing and providing as requested all necessary documents including, but not limited to, quotes and invoices for filing annual applications for E-rate support, *i.e.* FCC Forms 471, and for receipt of approved funding, *i.e.* Forms 472 (BEAR) and/or Forms 473 (SPI). If no, explain.
Yes, PCS understands and complies with all E-Rate assistance and deadlines.

4.2.12 Do you understand and agree that pricing information entered into BCSD's FCC Forms 471 will be publicly available, and that since the execution of the contract resulting from this procurement process will occur after the effective date of the FCC's Seventh Report and Order, the contract will not contain and will prohibit any restrictions barring publication of your pricing data as specified in 3.17.6. If no, explain.
Yes, PCS understands and agrees.

4.2.13 Does Contractor understand, acknowledge, and agree that BCSD typically utilizes the Billed Entity Applicant Reimbursement (BEAR) process, but discounted invoices may also be considered at BCSD's sole discretion. (yes/no) Yes

4.3 CUSTOMER SERVICE AND SUPPORT

4.3.1 Contractor shall designate a specific Customer Service Representative for general customer service assigned to support BCSD. (yes/no) Yes

4.3.2 Contractor shall designate a specific Technical Service Representative for technical support assigned to BCSD. (yes/no) Yes

4.3.3 Contractor shall provide to BCSD the direct dial telephone contact information for both the Customer Service Representative and the Technical Service Representative. (yes/no) Yes

4.3.4 Contractor shall meet onsite with BCSD at least once a year. (yes/no) Yes

4.4 WIRED EQUIPMENT

4.4.1 Describe in detail the make, model, architecture, features, and capabilities of the proposed core Router/switch.

Please see page 96 of proposal for response.

4.4.2 Clearly identify any/all features specified in 3.7 which the proposed core switches do NOT support. Explain if there are alternate means to accomplish the same or similar feature(s).

The proposed Extreme Networks 7520 Series Core Switches fully meet and comply with all features and requirements outlined in Section 3.7. Each specified capability is supported natively within the switch platform or through integrated management software.

4.4.3 Describe in detail the make, model, architecture, features, and capabilities of the proposed edge switches.

Please see page 99 of proposal for response.

4.4.4 Clearly identify any/all features specified in 3.8 which the proposed edge switches do NOT support. Explain if there are alternate means to accomplish the same or similar feature(s).

The proposed Extreme Networks 5520 and 5720 Line of Switches fully meet and comply with all features and requirements outlined in Section 3.8. Each specified capability is supported natively within the switch platform or through integrated management software.

4.4.5 Explain in detail the proposed warranty terms and any other warranty or maintenance options for BCSD's consideration. For example, clarify response times (i.e., 4-hour, 8-hour, next business day, etc.), onsite parts replacement, depot replacement, limited lifetime replacement, support, OS upgrades, etc., and the associated costs.

Please see page 103 of proposal for response.

4.4.6 Provide option(s) for "hardened" switches that can be use in un-common situations such as outside or where no HVAC cooling can be provided. Give description(s), model(s), and other information here and provide models and pricing in pricing section.

Please see page 105 of proposal for response.

4.4.7 Provide option(s) for VPN device solution(s) that can be use in un-common situations to provide LAN/WAN connectivity to a building that is not otherwise physically on the LAN/WAN. Give description(s), model(s), and other information here and provide models and pricing in pricing section.

Please see page 106 of proposal for response.

4.5 WIRELESS EQUIPMENT

4.5.1 Describe in detail the make, model, architecture, features, and capabilities of the proposed wireless access points.

Please see page 108 of proposal for response.

4.5.2 Is the proposed solution self-healing, self-optimizing? Explain in detail. Clarify if this is a function of the WAP, the wireless controller, the management system, a combination, or some other device.

Please see page 111 of proposal for response.

4.5.3 Will the proposed solution detect and avoid interference? Explain in detail. Clarify if this is a function of the WAP, the wireless controller, the management system, a combination, or some other device.

Yes. As previously detailed, the proposed solutions Smart RF capabilities provide real time monitoring of the network for external interference, neighbor interference, and non-Wi-Fi interference. The Smart RF feature periodically performs re-calibration of RF parameters (operating channel, transmit power level, etc.) in a coordinated fashion to mitigate co-channel interference for optimal RF performance. It then intelligently applies algorithms determining optimal channel and power selection for all WAPs in the network and constantly reacts to changes in the RF environment. The RF environmental information is collected by each WAP and forwarded to the Extreme Cloud Controller which coordinates the channel and power decisions.

4.5.4 Will the proposed solution include channel mapping, power adjustments, and any other service to maximize the solution's capability? Explain in detail. Clarify if these are functions of the WAP, the wireless controller, the management system, a combination, or some other device.

Please see page 112 of proposal for response.

4.5.5 Will the proposed solution provide load balance automatically. Explain in detail. Clarify if this is a function of the WAP, the wireless controller, the management system, a combination, or some other device.

Yes. The proposed solution supports Auto AP Balancing and can operate in failover mode or load-sharing mode. Load balancing across clusters is performed at the AP level. Extreme Cloud Controllers configured as Availability Pairs for high-availability can be configured for active-active, which evenly distributes WAP loads across both controllers. Support is also provided for Client Balancing to distribute client traffic evenly between WAPs in the same device group.

4.5.6 Does the proposed solution detect and mitigate rogue WAPs? Explain in detail. Clarify if this is a function of the WAP, the wireless controller, the management system, a combination, or some other device.

Please see page 113 of proposal for response.

4.5.7 In an ideal environment with no congestion, no bottlenecks, etc., explain the theoretical performance capabilities (i.e., maximum number of concurrent connections, maximum aggregate transmission rate, maximum aggregate receive rate, maximum number of concurrent HD (1080P) video streams per WAP, etc.) of one WAP as proposed.

Please see page 114 of proposal for response.

4.5.8 Understanding your response in 4.5.7 above is purely theoretical, clarify the more realistic performance capabilities to be expected from one WAP as proposed.

Please see page 115 of proposal for response.

4.5.9 Explain in detail the proposed licensing structure, if any, for the wireless access points.

Please see page 116 of proposal for response.

4.5.10 Explain in detail the proposed warranty terms and any other warranty or maintenance options for BCSD's consideration. For example, clarify response times (i.e., 4-hour, 8-hour, next business day, etc.), onsite parts replacement, depot replacement, etc., and the associated cost for each option.

Please see page 116 of proposal for response.

4.5.11 Provide solution(s) for wireless bridging that can be used in un-common situations to join a building to the LAN/WAN with Wi-Fi technology. Give description(s), model(s), and other information here and provide models and pricing in pricing section. Include "hardened" access point models and accessories such as antennas and Wi-Fi enclosures in description and pricing section.

Please see page 119 of proposal for response.

4.6 NETWORK MANAGEMENT

4.6.1 Describe in detail the make, model, architecture, features, version, and capabilities of the proposed network management system(s).

Please see page 121 of proposal for response.

4.6.2 Does the proposed system integrate with any Mobile Device Management solutions. Explain in detail.

Please see page 124 of proposal for response.

4.6.3 Explain how Network Access Control is implemented. Is it native to the proposed system or is it provided and integrated with another third-party product? Explain in detail.

Please see page 125 of proposal for response.

4.6.4 Explain the proposed licensing structure, if any, for the proposed network management system.

Please see page 126 of proposal for response.

4.6.5 Does the proposed network management system have the ability to distinguish between a district owned device and a non-district device? Explain in detail.

Please see page 126 of proposal for response.

4.6.6 Describe how the proposed network management system integrates with AD. Explain in detail.

Please see page 126 of proposal for response.

4.6.7 Should the district's existing RADIUS servers be utilized in the proposed configuration. If so, explain in detail. What are the benefits and risks?

Please see page 127 of proposal for response.

4.6.8 Explain with detail how the proposed network management system implements policy-based network control.

Please see page 127 of proposal for response.

4.6.9 Does the proposed network management system have the ability to black-list specific devices by MAC address and restrict by SSID? Explain in detail.

Please see page 128 of proposal for response.

4.6.10 Does the proposed network management system have traffic shaping, traffic prioritization, and traffic management capabilities? Explain in detail.

Please see page 130 of proposal for response.

4.6.11 Does the proposed network management system have application filtering, application prioritization, device filtering, and device prioritization capabilities? Explain in detail.

Please see page 131 of proposal for response.

4.6.12 Does the proposed network management system provide a spectrum analysis in graphical form of the wireless systems installed in the buildings? Explain in detail.

Please see page 132 of proposal for response.

4.6.13 Explain the reporting capabilities of the proposed network management system.

Please see page 133 of proposal for response.

4.6.14 Does the proposed network management system provide device tracking? Explain in detail.

Please see page 134 of proposal for response.

4.6.15 Does the proposed network management system allow importing MAC address, single or in batch? Explain in detail. Clarify what electronic file formats are supported.

Please see page 135 of proposal for response.

4.6.16 Wireless network must support and be configured for Active Directory integration with captive portal and sponsored onboarding for guest devices. Solution needs to be configured to support the assignment of policy and application control based on user and/or type of device. All of these features must be configurable with one SSID. Solution must be configurable to provide granularity that reaches beyond ports, VLANs and SSIDs down to the individual users, applications, and protocols. Solution must include a search feature that allows end systems to be searchable by port, MAC address and IP or IP/Port. Configuration to enforce policies network-wide for QOS, bandwidth, etc. Does your system do this? Explain.

Please see page 135 of proposal for response.

4.6.17 Explain in detail the proposed licensing structure for the network management system.

Please see page 136 of proposal for response.

4.6.18 Clarify if the network management system runs on server hardware, appliances, or VM's. If it will operate on a VM, provide the complete VM requirements to be provided by BCSD.

Please see page 137 of proposal for response.

4.6.19 Explain in detail the proposed warranty terms and any other warranty or maintenance options for BCSD's consideration. For example, clarify response times (i.e., 4-hour, 8-hour, next business day, etc.), onsite parts replacement, depot replacement, etc., and the associated cost for each option.

Please see page 138 of proposal for response.

4.6.20 Explain how your proposed solution addresses Bonjour such as printing, packet distribution, routing, and control.

Please see page 140 of proposal for response.

4.7 WIRELESS CONTROLLERS

4.7.1 Describe in detail the make, model, architecture, features, and capabilities of the proposed wireless controller(s).

Please see page 142 of proposal for response.

4.7.2 Is the wireless controller proposed in a true high availability (HA) configuration? Explain in detail. Also identify any redundant components.

Please see page 144 of proposal for response.

4.7.3 Does the proposed wireless controller perform load balancing. Explain in detail.

Please see page 145 of proposal for response.

4.7.4 Does the proposed wireless controller perform auto failover? Explain in detail.

Please see page 145 of proposal for response.

4.7.5 Explain the reporting capabilities of the proposed wireless controllers.

Please see page 145 of proposal for response.

4.8 NAC COMPATIBLITY OR SYSTEM

4.8.1 Describe in detail how your proposed system will be compatible with BCSD's NAC. If you are instead proposing a new NAC because compatibility is not possible, please skip this section and continue below in sections 4.8.2.

BCDS already currently has the ExtremeControl deployed within the district.
The proposed Extreme wired and wireless system is fully compatible with BCSD's current NAC system, ExtremeControl, providing you with investment protection. BCSD can leverage your existing ExtremeControl licenses and there is no need for retraining or to configure a new system. Furthermore, BCSD benefits from the more granular isolation policies (which prevent compromised endpoints from launching attacks while in the quarantine state) when using Extreme's policy-enabled devices.

4.8.2 Describe in detail the make, model, architecture, features, and capabilities of the proposed NAC system.

Not applicable. We recommend BCSD continue leveraging your current NAC system, ExtremeControl.

4.8.3 Describe how your NAC system will automatically distribute our devices to their proper subnets based on their enrollment profiles.

Not applicable. We recommend BCSD continue leveraging your current NAC system, ExtremeControl.

4.8.4 Describe how your NAC system is compatible with our MDM, JAMF.

Not applicable. We recommend BCSD continue leveraging your current NAC system, ExtremeControl.

4.9 WIRELESS SURVEY SOFTWARE

4.9.1 Paragraphs 3.7.3 and 3.13.1 document the district's understanding of industry best practices with regards to the physical placement of WAPs and the subsequent adjustments as indicated by the wireless surveys for optimization. Do you agree with this approach? Please acknowledge your agreement or clarify otherwise your proposed design approach.

Yes, agreement to best practices is acknowledged. Please note that in some cases where the environment is fully understood, the pre-install survey can possibly be lessened to save costs. The post-install survey to validate the performance is an excellent best-practice. PCS and Extreme l ook forward to sharing training with BCSD staff.

4.10 VALUE ENGINEERING

Please see page 149 of proposal for response.

4.11 PRICING PROPOSAL AND OTHER

4.11.1 Submit your proposed pricing in accordance with Section 8.0 an excel spreadsheet is provided as Exhibit A.

Specific scope will be outlined after contract and before main project initiation.

4.11.2 K12 hours: Any work related to this scope that could interfere or interrupt classroom instruction should be done outside of the hours below:

4.4. Wired Equipment

4.4.1 Describe in detail the make, model, architecture, features, and capabilities of the proposed core Router/switch.

The Extreme 7520 are purpose-built 48-port 10Gb and 48-port 25Gb switches designed for high-performance aggregation and core applications. As a universal hardware solution, the 7520 provides end-to-end secure network segmentation, in addition to advanced policy capabilities, with a user-selectable choice of Extreme's flagship switch operating systems. This makes the 7520 a uniquely flexible solution that can be deployed in a variety of aggregation and core environments.

The Extreme 7520 network hardware solution enables organizations to design networks that accommodate a variety of applications and east-west traffic patterns. With its high-density scale-out architecture, leading power efficiency, and airflow options, the 7520 delivers a cost-effective solution that optimizes power, cooling, and equipment room space, wherever your network operating center might be.

Three models of the 7520 are available:

7520-48XT-6C

48 x 1Gb/10Gb 10GBaseT copper ports (no MACsec)

6 x 40Gb/100Gb QSFP28 fiber ports (no MACsec)

7520-48Y-8C

48 x 1Gb/10Gb/25Gb SFP28 fiber ports (no MACsec)

8 x 40Gb/100Gb QSFP28 fiber ports (no MACsec)

7520-48YE-8CE

48 x 10/25Gb SFP28 fiber ports with MACsec support

8 x 100Gb QSFP28 fiber ports with MACsec support

Note: This model does not support stacking

Benefits

Network Management Flexibility
The 7520 Universal Switch series are managed by Extreme Platform ONE or ExtremeCloud IQ from the cloud or on-premises. Alternatively, 7520 on-box management can be done manually via a web-based GUI or generic command-line interface (CLI).

High-Performance Stacking
Two of the 7520's QSFP28 uplink ports can be used for high-speed 400Gb stacking when running Switch Engine (EXOS). Up to eight systems can be stacked using qualified direct attach cables and/or optical transceivers.

(Note: Stacking is not supported on the 7520-48YE-8CE model or when running Fabric Engine (VOSS)).

Universal Hardware
The 7520 Series comes with a dual-persona capability, allowing you to choose your Operating System (OS). Either the Switch Engine (EXOS) or Fabric Engine (VOSS) OS can be selected at switch start-up or changed at a later stage. When selected, the switch assumes the features and capabilities of that OS. 7520 OS selection can also be automated with Extreme Platform ONE or ExtremeCloud IQ so that the desired OS can be automatically loaded at switch start-up, facilitating remote OS enablement.

Security
Extreme Universal hardware enables the extension and enforcement of Fabric and Universal ZTNA policies. Wherever users connect through the network, their access is secure and segmented. ExtremeControl and ExtremeCloud Universal ZTNA, which combines zero-trust network and application access in one solution, automatically configures devices to enforce security policy consistently. When used in concert with Extreme Fabric, ExtremeControl and/or Universal ZTNA becomes part of the fabric services that automate segmentation and allow the network to flex for efficiency and resiliency while keeping security policy consistent end-to-end.

Network Fabric
The 7520 series switches support Extreme's network fabric natively for network virtualization, automation, and network security. Extreme Fabric is the industry's most simple, resilient, and secure end-to-end, enterprise network fabric solution. Fabric automates discovery and onboarding of network and user devices. Its sub-second convergence reduces unplanned downtime and maintenance windows. Automated micro-segmentation and stealth topology enhance and automate network security across campus, data center, and branch. Fabric is included free with the purchase of the 7520, no additional licenses or controllers are required.

Instant Onboarding
7520 Series onboarding to the cloud is a hands-off operation using zero touch provisioning. Simply unpack the 7520 Series switch, connect it to the network, and it automatically connects to the cloud, ready to be provisioned. New switches can be configured, one-by-one, with a few clicks. Instant port, instant secure port, and instant stack all further reduce time spent on deployment.

Instant Port*
Instant Port automates adds, moves or changes across 7520 Series switch ports, eliminating the need for manual port configuration. The 7520 Series automatically detects the connected device and applies the correct port parameters. The result is significant time savings when adding or moving devices across the 7520 Series wired network. A simple cloud interface allows instant Port definitions of customer designated device types

which can then be applied across a single switch, a stack or even all 7520 Series switches in the network. *Supported via Switch Engine only

Instant Secure Port*
Instant Secure Port leverages ExtremeControl and ExtremeCloud Universal ZTNA for authentication and zero-trust policy enforcement across the 7520 Series switch ports, while providing the same add, move, and change automation features of Instant Port. It simplifies 7520 Series security by using Control or Universal ZTNA's cloud-based security capabilities, including RADIUS authentication, unified visibility and reporting, as well as policy enforced locally on 7520 Series ports. In doing so, it delivers a consistent and frictionless security experience for any user or device connecting through the 7520 Series switch.

(Note: ExtremeControl and ExtremeCloud Universal ZTNA requires a separate license.)

*Supported via Switch Engine only

Instant Stack*
Instant Stack simplifies cloud-based stack provisioning, enabling the entire switch stack to be set up through a single push-button operation. Real - world stack information, including each switch model and their stack order is captured and replicated in the cloud. Once set up, the entire stack is then ready to be cloud-provisioned.

*Supported via Switch Engine only

4.4.2 Clearly identify any/all features specified in 3.7 which the proposed core switches do NOT support. Explain if there are alternate means to accomplish the same or similar feature(s).

The proposed **Extreme Networks 7520 Series Core Switches** fully meet and comply with all features and requirements outlined in Section 3.7. Each specified capability is supported natively within the switch platform or through integrated management software.

4.4.3 Describe in detail the make, model, architecture, features, and capabilities of the proposed edge switches.

5520 Series

The 5520 Series is a family of high-performance, feature-rich edge and aggregation switches designed for the next-generation digital enterprise. Available in 24 and 48-port 1 Gigabit models, 1/2.5/5 Gigabit multi-rate models, as well as, a 24-port 10 Gigabit model, the 5520 Series provides end-to-end secure network segmentation and advanced policy capabilities that can be deployed across a range of edge, aggregation, and wiring closet environments. As a universal hardware solution, the 5520 offers a user-selectable choice of Extreme's flagship switch operating systems.

The 5520 supports 10Gb and 25Gb modular uplinks for flexible linkage to other switches or devices over a range of media. Extended Edge Switching controlling bridge is also available in support of V300/V400 edge devices, and select models offer a choice between Front to Back or Back to Front cooling. The 5520 Series offers 30W, 60W, and 90W PoE, making it an ideal wired backend for wireless APs or in support of next-gen powered Ethernet devices, such as digital signage, pan-tilt-zoom cameras, smart lighting, or point-of-sale terminals.

5720 Series

The 5720 Series is a family of high-performance, feature-rich edge and aggregation switches designed for the next-generation digital enterprise. Available in 24 and 48-port gigabit and multi-gigabit models, the 5720 is based on a universal hardware solution, providing end-to-end secure network segmentation and advanced policy capabilities. Compatible with your choice of Extreme's flagship switch OS, the 5720 is uniquely flexible, stackable, and can be deployed across a range of edge, aggregation, and wiring-closet environments. All models offer 90W PoE in support of NextGen powered Ethernet devices, such as digital signage, pan-tilt-zoom cameras, smart lighting, or point-of-sale terminals.

Benefits

Network Management Flexibility

The 5520 Universal Switch series are managed by Extreme Platform ONE or ExtremeCloud IQ from the cloud or on-premises. Alternatively, 5520 onbox management can be done manually via a web-based GUI or generic command-line interface (CLI).

Extreme Platform ONE™

Extreme Platform ONE™ is an enterprise connectivity platform that integrates networking and security with AI into one powerful and radically simplified experience and licensing

model. It supports NetOps, SecOps, and business teams with built in automation and enables organizations to regain control, unlock innovation, and boost productivity through:

- One integrated experience that is easy to use.
- Automation through built-in AI that boosts productivity, reducing cycle time for many tasks from hours to minutes.
- Simplified licensing that makes the solution as easy to buy as it is to use.
- AI-assisted workflows for configuration, deployment, and management.
- Extreme Fabric and third-party switch visualization and management in cloud.
- Inventory management simplifies budgeting, planning and compliance.

Power over Ethernet (PoE)

All 5520 models support 30W, 60W, and 90W PoE that conforms with IEEE 802.3bt. This enables the 5520 to address the needs of powered edge devices, while eliminating the need for additional electrical cabling and circuits. In addition, 5520 PoE models support perpetual and fast PoE for even more efficient and reliable powered edge device operation.

VIM Options for Flexible Uplinks

The 5520 supports Versatile Interface Modules (VIMs) providing flexible uplink capabilities with a single VIM slot. VIM options include four-port 10Gb or 25Gb modules that include LRM and 256-bit MACsec support., real-time audio/ video transmission over Ethernet. meeting the quality of service required for today's high-definition, time- sensitive multimedia streams.

High-Performance Stacking

The 5520 Series supports high-speed 200Gb* stacking when running Switch Engine via its two built-in QSFP28 stacking ports. Up to eight systems can be stacked using qualified QSFP+ direct attach cables and optical transceivers.

*200Gb stacking available with Switch Engine 31.6

Audio Video Bridging

The 5520 series supports IEEE 802.1 Audio Video Bridging (AVB) when running Switch Engine OS. This allows 5520 models to deliver reliable, realtime audio/video transmission over Ethernet, meeting the quality of service required for today's high-definition, time-sensitive multimedia streams.

Universal Hardware

The 5520 Series comes with a dual-persona capability, allowing you to choose your Operating System (OS). Either the Switch Engine (EXOS) or Fabric Engine (VOSS) OS can be selected at switch start-up or changed at a later stage. When selected, the switch assumes the features and capabilities of that OS. 5520 OS selection can also be automated with Extreme Platform ONE or ExtremeCloud IQ so that the desired OS can be automatically loaded at switch start-up, facilitating remote OS enablement.

Security

Extreme Universal hardware enables the extension and enforcement of Fabric and Universal ZTNA policies. Wherever users connect through the network, their access is secure and segmented. ExtremeCloud Universal ZTNA, which combines zero-trust network and application access in one solution, automatically configures devices to enforce security policy consistently. When used in concert with Extreme Fabric, Universal ZTNA becomes part of the fabric services that automate segmentation and allow the network to flex for efficiency and resiliency while keeping security policy consistent end-to-end.

Network Fabric

The 5520 series switches support Extreme's network fabric natively for network virtualization, automation, and network security. Extreme Fabric is the industry's most simple, resilient, and secure end-to-end, enterprise network fabric solution. Fabric automates discovery and onboarding of network and user devices. Its sub-second convergence reduces unplanned downtime and maintenance windows. Automated micro-segmentation and stealth topology enhance and automate network security across campus, data center, and branch. Fabric is included free with the purchase of the 5520, no additional licenses or controllers are required.

Instant Onboarding

5520 Series onboarding to the cloud is a hands-off operation using zero touch provisioning. Simply unpack the 5520 Series switch, connect it to the network, and it automatically connects to the cloud, ready to be provisioned. New switches can be configured, one-by-one, with a few clicks. Instant port, instant secure port, and instant stack all further reduce time spent on deployment.

Instant Port*

Instant Port automates adds, moves or changes across 5520 Series switch ports, eliminating the need for manual port configuration. The 5520 Series automatically detects the connected device and applies the correct port parameters. The result is significant time savings when adding or moving devices across the 5520 Series wired network. A simple cloud interface allows instant Port definitions of customer designated device types

which can then be applied across a single switch, a stack or even all 5520 Series switches in the network.

*Supported via Switch Engine only

Instant Secure Port*

Instant Secure Port leverages ExtremeCloud Universal ZTNA for authentication and zero-trust policy enforcement across the 5520 Series switch ports, while providing the same add, move, and change automation features of Instant Port. It simplifies 5520 Series security by using Universal ZTNA's cloud-based security capabilities, including RADIUS authentication, unified visibility and reporting, as well as policy enforced locally on 5520 Series ports. In doing so, it delivers a consistent and frictionless security experience for any user or device connecting through the 5520 Series switch. (Note: ExtremeCloud Universal ZTNA requires a separate license.)

*Supported via Switch Engine only

Instant Stack*

Instant Stack simplifies cloud-based stack provisioning, enabling the entire switch stack to be set up through a single push-button operation. Realworld stack information, including each switch model and their stack order is captured and replicated in the cloud. Once set up, the entire stack is then ready to be cloud-provisioned.

*Supported via Switch Engine only

Integrated Application Hosting (5720 Series)

Some 5720 Series models support Extreme's Integrated Application Hosting which leverages the switch's hardware and software design to run onboard applications without impacting switch performance. 5720-24MXW and 5720-48MXW models can run a Guest VM directly on the switch, supporting third-party or customized applications to meet specific business or operational needs. This can provide additional network insight or enable new network applications without a separate hardware device.

4.4.4 Clearly identify any/all features specified in 3.8 which the proposed edge switches do NOT support. Explain if there are alternate means to accomplish the same or similar feature(s).

The proposed **Extreme Networks 5520 and 5720 Line of Switches** fully meet and comply with all features and requirements outlined in Section 3.8. Each specified capability is supported natively within the switch platform or through integrated management software.

4.4.5 Explain in detail the proposed warranty terms and any other warranty or maintenance options for BCSD's consideration. For example, clarify response times (i.e., 4-hour, 8-hour, next business day, etc.), onsite parts replacement, depot replacement, limited lifetime replacement, support, OS upgrades, etc., and the associated costs.

PCS and Extreme Networks is pleased to propose a comprehensive warranty and support solution designed to ensure high availability, predictable cost of ownership, and full E-Rate compliance for BCSD's network infrastructure. The proposed coverage applies to all **Extreme Networks switches and wireless access points** included in this bid.

Core Switches (Extreme Networks 7520 Series)

For the core switching layer, PCS proposes **Next Business Day (NBD) Hardware Replacement** coverage (**Extreme SKU 97304**). Under this service, any verified hardware failure will trigger expedited shipment of a replacement unit for **next business day delivery**, minimizing downtime and maintaining operational continuity for BCSD's network core.

In addition, this service includes:

- **24×7 Technical Assistance Center (TAC)** support from Extreme Networks, providing expert troubleshooting, fault isolation, and configuration assistance.
- **Access to Operating System (OS) updates, feature releases, and security patches**, ensuring the network remains stable, current, and secure.
- **Online support tools and documentation**, including ExtremeCloud IQ resources and knowledge base access for efficient issue resolution.

This next-day replacement model ensures that BCSD's most critical network components receive the fastest possible turnaround and enterprise-grade support.

Edge Switches and Wireless Access Points (Extreme Networks 5520 / 5720 and Wireless Products)

For all proposed edge switches and wireless access points, PCS and Extreme Networks recommend coverage under the **Extreme K-12 100% E-Rate Eligible Technical Assistance Center (TAC) and Operating System / Right-to-Use (RTU) License** program. This program delivers continuous software and support coverage while maximizing the district's ability to fund these services under E-Rate guidelines.

This E-Rate eligible support includes:

- **Unlimited 24×7 access to Extreme TAC** for remote technical assistance.

- **Full entitlement to software and firmware updates**, including major OS upgrades and feature enhancements.
- **Right-to-Use (RTU) licensing** for all applicable software features for the life of the device.
- **Proactive maintenance and security patching**, ensuring long-term operational integrity.

By leveraging the K-12 TAC and OS/RTU License program, BCSD benefits from comprehensive technical coverage at the lowest eligible cost.

Extreme Networks Limited Lifetime Warranty (LLW)

All proposed Extreme Networks hardware is covered under **Extreme's Limited Lifetime Warranty**, providing long-term protection and investment assurance. The LLW includes:

- **Lifetime hardware replacement** for as long as the original end-user owns the product and it remains under active sale or support.
- Coverage for **field-replaceable components** such as power supplies and fans under normal operating conditions.
- **Access to maintenance and bug-fix software** necessary to maintain product stability and compatibility.
- Standard **Return Merchandise Authorization (RMA)** processing, with advanced replacement available through the selected TAC or NBD programs.

When combined with the proposed support services, the LLW ensures BCSD's network hardware is protected throughout its life cycle, with both rapid response and manufacturer-backed replacement coverage.

Optional Enhanced Service Levels

PCS can also provide optional **4-Hour Advanced Replacement** or **On-Site Response** coverage for districts requiring faster SLAs or localized hardware staging. Pricing for these enhanced maintenance options can be provided separately for BCSD's consideration.

Summary

This warranty and maintenance plan delivers a complete, tiered protection strategy for BCSD:

- **Core Switches:** Next Business Day Replacement (SKU 97304) with full TAC and OS support.
- **Edge and Wireless:** K-12 100% E-Rate Eligible TAC and OS/RTU License for continuous support and upgrades.
- **All Hardware:** Covered under **Extreme Networks' Limited Lifetime Warranty**, ensuring long-term reliability and protection.

Together, these programs provide BCSD with enterprise-grade support, cost efficiency, and compliance with E-Rate funding requirements, while ensuring the district's network remains reliable, secure, and up to date for years to come.

For more warranty information, please visit:
https://www.extremenetworks.com/support/policies

4.4.6 Provide option(s) for "hardened" switches that can be use in un-common situations such as outside or where no HVAC cooling can be provided. Give description(s), model(s), and other information here and provide models and pricing in pricing section.

Extreme Industrial Switches are a family of ruggedized Layer 2 switches designed to operate under harsh environments and extended temperature conditions. They provide continuous uptime, manageability, and operational efficiency. With flexible PoE options of IEEE 802.3af, 802.3at and 802.3bt supporting up to 90W PoE per port, each switch offers the performance needed for today's power-hungry surveillance devices and WLAN access points.

Extreme Industrial Switches are an excellent choice for industrial environments, including intelligent transportation systems, utilities, and smart cities. Full redundant ring technology creates fault- tolerant networks with high availability based on industry standard technologies.

Extreme Industrial Switches can automatically connect to a Fabric Connect network via the Fabric Attach software-based feature which enables the switches to be quickly mapped as endpoints within a virtualized Fabric Connect service.

Benefits

Fabric Attach

Fabric Attach capability on the ISW Series helps automate the connection to Extreme's campus-based Fabric Connect solution. Fabric Attach provides zero-touch edge provisioning and allows ISW switches to take advantage of the virtualized services and inherent security capabilities of the Extreme Fabric Connect infrastructure.

Flexible PoE

The ISW Series offers models that include standards-based IEEE 802.3af, 802.3at and up to IEEE 802.3bt on select models, enabling flexible 15W/30W/60W/90W of PoE (Power over Ethernet) capability per port. PoE eliminates the need for additional electrical cabling and circuits otherwise needed to power Industrial IoT devices or wireless APs.

Intelligent and Resilient Layer 2 Services

ISW switches provide intelligent Layer 2 switching including Spanning Tree (STP, RSTP, MSTP), resilient LACP and advanced Ethernet Ring Protection protocols. They support multiple ring topologies such as Single/Dual Ring along with Dual Homing and Balancing Chain capabilities, enabling highly flexible and resilient deployment options. Having a reliable network is very important to Ethernet applications, especially in an Industrial domain. ISW-Series Managed Industrial Ethernet Switches provide fast failover ring protection enabling sub-second convergence, ensuring seamless network operation in the event of a link loss or a network device error.

Quality of Service

QoS (Quality of Service) features allow you to allocate network resources to mission-critical applications at the expense of applications that are less sensitive to such factors as time delays or network congestion. You can configure your network to prioritize specific types of traffic, ensuring that each type receives the appropriate QoS level. The ISW switches can be configured to have 8 output Class of Service (CoS) queues per port and support Strict Priority with Weighted Round Robin scheduling.

Security

Edge Security is important when connecting 3rd party devices and hosts to the switch. ISW series supports both MAC authentication and 802.1X EAP authentication mechanisms on a per port basis. ISW switches support both RADIUS and TACACS+ for access control.

ACL (Access Control List) function supports access control security for MAC address, IP address, Layer 4 Port, and Type of Service. Each has five actions: Deny, Permit, Queue Mapping, CoS (Class of Service) Marking, and Copy Frame. You can set the default ACL rule to Permit or Deny.

4.4.7 Provide option(s) for VPN device solution(s) that can be use in un-common situations to provide LAN/WAN connectivity to a building that is not otherwise physically on the LAN/WAN. Give description(s), model(s), and other information here and provide models and pricing in pricing section.

Switch based VPN services are provided on all switches proposed. There is a high variety of options available to BCSD ranging from VLAN's to L3 VPN's, as well as SPB (Shortest Path

Bridging) which creates a secure user tunnel in a unique encapsulation visible only to that user.

ExtremeCloud™ SD-WAN enables predictable user experiences across One Network with a flexible, secure solution. It offers the usual connectivity, continuity, and cost benefits of SD-WAN, while helping to improve • security, automation, and resilience with Fabric to the Edge • user experience and productivity with Application Performance Management • manageability with Unified Management of wired, wireless, and SD-WAN devices • cost control with cost-effective OPEX subscription, flexible subscription terms, and speed tiers.

Enterprise Package Descriptions

Service Subscription SKU	SD-WAN Service Level/BW	Subscription Type	New Subscription Term	Renewal Term	Associated HW
Branch-XS	XS/250Mbps	Site	1, 3, or 5 years	Flexible (minimum of 1 year)	ipe-30so
Branch-S	S/500Mbps	Site			ipe-30ax
Branch-M	M/750Mbps	Site			ipe-40ax-v2
DC-S	L/1000Mbps	Site			ipe-420ax
DC-M	XL/2Gbps	Site			ipe-2200ax-T
DC-L	XXL/10Gbps	Site			ipe-2200ax-10G-SR or ipe-2200ax-10G-LR

BCSD can configure IPsec encryption on a Fabric Extend tunnel, which creates a secure, encrypted connection between two fabric sites over an unsecured IP network. This is done using the Extreme VOSS operating system.

4.5 WIRELESS EQUIPMENT

4.5.1 Describe in detail the make, model, architecture, features, and capabilities of the proposed wireless access points.

Here's a **detailed technical description** of the proposed Extreme Networks wireless access points based on the information provided.

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1. Overview

Extreme Networks' proposed lineup of wireless access points (APs) represents a combination of **Wi-Fi 6E and Wi-Fi 7 architectures** designed for both **indoor and outdoor environments**. These devices integrate **AI/ML-driven management**, **BLE/Zigbee IoT radios**, **multirate Ethernet ports**, and **sensor capabilities**, providing comprehensive wireless connectivity and intelligent network optimization.

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2. Make and Model Summary

Model	Type	Frequency Bands	Antenna Type	Environment	Notable Features
AP4000-WW	Tri-Radio Wi-Fi 6E	2.4 / 5 / 6 GHz	Internal	Indoor	BLE/Zigbee, AI/ML, Green Mode
AP4020-WW	Quad-Radio Wi-Fi 7	2.4 / 5 / 6 GHz + Sensor	Internal	Indoor	Multi-rate Port, Advanced Sensing
AP460C-WW	Tri-Radio Wi-Fi 6	2.4 / 5 GHz + Sensor	Internal	Outdoor	Dual 5GHz, BLE/Zigbee, AI/ML
AP4060-WW	Quad-Radio Wi-Fi 7	2.4 / 5 / 6 GHz + Sensor	Internal	Outdoor	Multi-rate Port

Model	Type	Frequency Bands	Antenna Type	Environment	Notable Features
AP4060X-WW	Quad-Radio Wi-Fi 7	2.4 / 5 / 6 GHz + Sensor	External	Outdoor	External Antennas
AP5020-WW	Tri-Radio Wi-Fi 7	2.4 / 5 / 6 GHz	Internal	Indoor	AI/ML, Multirate Port
AP460S12C-FCC	Tri-Radio Wi-Fi 6	4x4 5GHz + 2x2 Dual Band + 1x1 Sensor	Internal	Outdoor	120° Sector, 2.5GE + 1GE Ports
AP460S6C-FCC	Tri-Radio Wi-Fi 6	4x4 5GHz + 2x2 Dual Band + 1x1 Sensor	Internal	Outdoor	60° Sector, 2.5GE + 1GE Ports

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3. Architecture

Radio and Frequency Design

- **Tri-Radio and Quad-Radio Designs** allow simultaneous operation across multiple bands:
  - **Wi-Fi 6E (802.11ax)** adds the **6 GHz** band for reduced congestion.
  - **Wi-Fi 7 (802.11be)** provides enhanced throughput, lower latency, and improved efficiency using **Multi-Link Operation (MLO)**.
- **Dedicated Sensor Radios** in quad models enable continuous RF monitoring and security scanning without impacting client performance.

Antenna Configuration

- **Internal Antennas** are used for low-visibility indoor or compact outdoor setups.
- **External Antennas (AP4060X)** provide flexibility for extended coverage and directional deployment.
- **Sector Antennas (AP460S Series)** offer **60° or 120°** coverage patterns ideal for focused outdoor or stadium environments.

Ethernet and Power

- Equipped with **multi-rate Ethernet ports (1G / 2.5G)** to handle high throughput.
- **PoE (Power over Ethernet)** supported, simplifying deployment and minimizing cabling.

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4. Key Features and Capabilities

a. Wireless Performance

- High-capacity multi-user capabilities via **MU-MIMO** and **OFDMA**.
- **Dual 5GHz operation** in select outdoor models for denser client environments.
- **Wi-Fi 7 enhancements** (in AP4020, AP4060, AP4060X, AP5020) such as wider channel bandwidths and reduced latency.

b. Smart Management and AI

- **ExtremeCloud™ IQ** integration enables centralized cloud-based monitoring, configuration, and AI-driven analytics.
- **AI/ML Green Mode** dynamically adjusts power and radio parameters to optimize energy efficiency and performance.
- **ExtremeCloudController** on premises controller enables centralized on-premise based monitoring, configuration, and AI-driven analytics.

c. IoT and Sensor Integration

- Embedded **BLE/Zigbee radios** support IoT device connectivity, indoor location tracking, and environmental monitoring.
- **Integrated light and power sensors** provide automation and energy management capabilities.

d. Environmental and Mounting Flexibility

- **Outdoor-rated enclosures** for AP460 and AP4060 series withstand harsh environments.
- **T-Bar and pole mount kits** (e.g., AH-ACC-BKT-AX-TB) simplify installation in ceiling, wall, or outdoor settings.

e. Security and Compliance

- Support for the latest **WPA3 security protocols**.
- **Dedicated sensor radios** enhance intrusion detection and spectrum analysis.

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5. Summary of Advantages

- **High performance and future-proofing** with Wi-Fi 6E and Wi-Fi 7 support.
- **Flexible deployment** across indoor and outdoor environments.
- **AI/ML-driven optimization** improves user experience and network efficiency.
- **IoT-ready platform** with integrated BLE/Zigbee radios.
- **Energy-efficient design** through adaptive green mode technologies.

4.5.2 Is the proposed solution self-healing, self-optimizing? Explain in detail. Clarify if this is a function of the WAP, the wireless controller, the management system, a combination, or some other device.

Yes. The proposed Extreme Wireless solutions embedded Smart RF (Self-Monitoring At Run Time RF Management) capabilities provide on-going RF optimization and self-healing functions by continuously monitoring the network in real-time and automatically adjusting channels and power as needed. After gathering information from the RF environment, Smart RF makes intelligent configuration choices. It monitors the network for interference and client connectivity and intelligently applies algorithms determining optimal channel and power selection for all WAPs in the network and constantly reacts to changes in the RF environment. Real-time network monitoring allows Smart RF to provide self-healing functions, providing automatic mitigation from potentially problematic events such as radio interference, non-Wi-Fi interference (noise), external Wi-Fi interference, coverage holes, and radio failures. The solutions self-healing capability enables the WLAN to better maintain wireless client performance and site coverage during dynamic RF environment changes, which would otherwise require manual reconfiguration to resolve.

Smart RF leverages the Off-Channel Scanning (OCS) capabilities built into each ExtremeWireless 802.11ax AP to monitor the RF environment in real-time on both 2.4 GHz and 5 GHz bands. When Smart RF is enabled, by default, each Smart RF-managed radio will go off-channel for 50 milliseconds every 6 seconds to monitor the RF environment for each channel; this scanning interval is configurable. Over time, each radio is able to gain a full picture of the RF environment and learn neighboring APs, sources of Wi-Fi interference, and sources of non-Wi-Fi interference. The RF environmental information is collected by

each WAP and forwarded to the Extreme Cloud Controller which coordinates the channel and power decisions. Smart RF uses the RF environmental information to make intelligent power and channel changes as the RF environment evolves over time, and to initiate Neighbor Recovery, Interference Recovery, and Coverage Hole Recovery features.

4.5.3 Will the proposed solution detect and avoid interference? Explain in detail. Clarify if this is a function of the WAP, the wireless controller, the management system, a combination, or some other device.

Yes. As previously detailed, the proposed solutions Smart RF capabilities provide real time monitoring of the network for external interference, neighbor interference, and non-Wi-Fi interference. The Smart RF feature periodically performs re-calibration of RF parameters (operating channel, transmit power level, etc.) in a coordinated fashion to mitigate co-channel interference for optimal RF performance. It then intelligently applies algorithms determining optimal channel and power selection for all WAPs in the network and constantly reacts to changes in the RF environment. The RF environmental information is collected by each WAP and forwarded to the Extreme Cloud Controller which coordinates the channel and power decisions.

4.5.4 Will the proposed solution include channel mapping, power adjustments, and any other service to maximize the solution's capability? Explain in detail. Clarify if these are functions of the WAP, the wireless controller, the management system, a combination, or some other device.

Yes. The Extreme CloudController leverages embedded Smart RF capabilities to automatically and intelligently adjust channel and power to achieve optimal RF performance. Smart RF centralizes the decision process and makes intelligent RF configuration decisions using information obtained from the RF environment. Smart RF helps reduce ongoing management and maintenance costs through the periodic re-calibration of the network, which can be initiated manually or can be automatically scheduled to ensure the RF configuration is optimized for RF environment changes such as new sources of interference, or neighboring access points. The RF environmental information is collected by each WAP and forwarded to the Extreme Cloud Controller which coordinates the channel and power decisions.

The channels and power values assigned to the Smart RF-managed radios are dependent on the country of deployment, the channel and power configuration defined in the Smart RF Policy, and whether the Smart RF Policy is enabled. The channel and power parameters are fully configurable within the Smart RF Policy, enabling an administrator to tweak the system to suit their specific wireless deployment needs. For example, administrators can

modify the Smart RF policy to exclude DFS channels or lower the minimum and maximum power values for high-density deployments.

Smart RF also provides self-healing functions by monitoring the network in real-time and provides automatic mitigation from potentially problematic events such as radio interference, coverage holes, and radio failures. The base solution also includes basic Wireless Intrusion Prevention System (WIPS) functionality to detect and mitigate rogue access points and rogue clients.

4.5.5 Will the proposed solution provide load balance automatically. Explain in detail. Clarify if this is a function of the WAP, the wireless controller, the management system, a combination, or some other device.

Yes. The proposed solution supports Auto AP Balancing and can operate in failover mode or load-sharing mode. Load balancing across clusters is performed at the AP level. Extreme Cloud Controllers configured as Availability Pairs for high-availability can be configured for active-active, which evenly distributes WAP loads across both controllers. Support is also provided for Client Balancing to distribute client traffic evenly between WAPs in the same device group.

4.5.6 Does the proposed solution detect and mitigate rogue WAPs? Explain in detail. Clarify if this is a function of the WAP, the wireless controller, the management system, a combination, or some other device.

Yes. Extreme WiNG supports rogue detection through its integrated Wireless Intrusion Prevention System (WIPS) functionality. This feature can identify unauthorized access points connected to the network or neighboring access points that could pose a security risk.

How it works

- **Rogue AP definition**: A rogue AP is an unsanctioned access point that has connected to your wired network infrastructure.
- **Detection mechanisms**:
  - **WIPS policies**: You must enable and configure WIPS policies to activate unauthorized device detection.
  - **SSID and encryption checks**: You can configure the system to identify rogue APs based on their SSID names and the type of encryption they use, flagging any that don't meet your security standards (e.g., WEP or no encryption).

- **Off-channel scanning**: The system can periodically scan other channels to detect foreign APs even if they are not on the same channel the AP is currently using to forward traffic.
- **AirDefense Essentials**: This service can analyze MAC addresses to determine if a BSS (Basic Service Set) falls within the calculated range of a wired AP, marking it as rogue if it does.

4.5.7 In an ideal environment with no congestion, no bottlenecks, etc., explain the theoretical performance capabilities (i.e., maximum number of concurrent connections, maximum aggregate transmission rate, maximum aggregate receive rate, maximum number of concurrent HD (1080P) video streams per WAP, etc.) of one WAP as proposed.

Below is a theoretical performance capabilities of the **Extreme Networks AP4020 (Wi-Fi 7, 2x2:2 on 2.4/5/6 GHz + dedicated sensor)** in an **ideal, uncongested** environment.

Capability	Theoretical Max Value	Notes
Maximum Aggregate PHY Rate	**9,335 Mbps** (9.335 Gbps)	This is the sum of the maximum theoretical Physical Layer (PHY) rates across the three data radios: 6 GHz (5,765 Mbps), 5 GHz (2,882 Mbps), and 2.4 GHz (688 Mbps). Sitecore Content Hub + 1
Maximum Aggregate Transmission Rate	**≈ 9.335 Gbps**	In ideal conditions, the combined theoretical transmission (downlink) rate approaches the maximum aggregate PHY rate.
Maximum Aggregate Receive Rate	**≈ 9.335 Gbps**	Similarly, the combined theoretical receive (uplink) rate approaches the maximum aggregate PHY rate.
Maximum Concurrent Connections (Clients)	**1,536** total	This is the theoretical maximum number of user associations cited in the AP's datasheet (512 clients per radio × 3 radios). Sitecore Content Hub + 2
Max Concurrent Full-Rate Wi-Fi 7 Clients (2x2)	**1**	Limited by the fact that the client's peak PHY rate (5,764 Mbps) is more than half of the AP's total capacity (9,335 Mbps), capping the simultaneous *full-rate* 2x2 clients to 1.
Max Concurrent Full-Rate Wi-Fi 6 Clients (1x1)	**6**	Limited by the total number of spatial streams (6 streams total across all radios) that the AP can simultaneously dedicate.
Max Concurrent HD (1080p) Video Streams	**≈ 1,867 Streams**	Based on the maximum aggregate PHY rate (9,335 Mbps) and assuming a high-quality stream requires **5 Mbps** (9335 ÷ 5).

4.5.8 Understanding your response in 4.5.7 above is purely theoretical, clarify the more realistic performance capabilities to be expected from one WAP as proposed.

Below is a realistic performance capabilities of the **Extreme Networks AP4020 (Wi-Fi 7, 2x2:2 on 2.4/5/6 GHz + dedicated sensor)** in an **ideal, uncongested** environment.

Capability	Theoretical Max	**Realistic Aggregate Throughput**	Key Limiting Factors
Max Aggregate PHY Rate	9.335 Gbps	**4.5 - 6.0 Gbps**	**MAC Efficiency & Overhead:** Actual user throughput (goodput) is typically 45%–65% of the PHY rate due to protocol overhead, retransmissions, and the half-duplex nature of Wi-Fi. **Uplink Bottleneck:** The primary uplink is a **5GBase-T** port, capping the *total* traffic that can leave the AP at 5 Gbps.
Maximum Concurrent Connections	1,536 total	**100 - 300 Active Clients**	**Application Demand:** The number of clients drops significantly when they are **active** (e.g., streaming video or using cloud apps) versus merely *associated* (idle). For high-demand traffic, network designers typically use 50-75 active clients per AP as a planning guideline.
Max Aggregate Transmission Rate	9.335 Gbps	**2.5 - 4.0 Gbps**	This is constrained by the same efficiency factors as the throughput, especially on the 6 GHz band which provides the bulk of the speed. You must have a **Wi-Fi 7 client** (not Wi-Fi 6/6E) to achieve these top-end results.
Max Concurrent HD (1080p) Video Streams	≈ 1,867 streams (at 5 Mbps)	**500 - 800 Streams**	This is the total maximum streams that the **4.5 - 6.0 Gbps** realistic throughput can support, accounting for necessary airtime for control traffic and other clients. (Assuming $5\ \mathrm{Mbps}$ per stream).

4.5.9 Explain in detail the proposed licensing structure, if any, for the wireless access points.

Universal / pooled licensing (newer model)

- Extreme offers a newer model called **Universal Licensing** under ExtremeCloud IQ, XIQ-Site Engine and Extreme Platform One:
  - Licenses are **pooled**, device-agnostic (not strictly per AP), and portable across device types (wireless, wired, third-party) with the Universal model.
  - These license bundles include cloud/device license access and TAC/OS for devices

SKU	Category of Equipment
USK12-STD-A-S-C-EW	**4000 SERIES SWITCHES, 5300 SERIES SWITCHES, AND ALL ACCESS POINTS**
USK12-STD-A-S-C-EW-3Y	**4000 SERIES SWITCHES, 5300 SERIES SWITCHES, AND ALL ACCESS POINTS**
USK12-STD-A-S-C-EW-5Y	**4000 SERIES SWITCHES, 5300 SERIES SWITCHES, AND ALL ACCESS POINTS**
USK12-STD-B-S-C-EW	**5400 SERIES SWITCHES**
USK12-STD-B-S-C-EW-3Y	**5400 SERIES SWITCHES**
USK12-STD-B-S-C-EW-5Y	**5400 SERIES SWITCHES**
USK12-STD-C-S-C-EW	**5500 SERIES SWITCHES**
USK12-STD-C-S-C-EW-3Y	**5500 SERIES SWITCHES**
USK12-STD-C-S-C-EW-5Y	**5500 SERIES SWITCHES**
USK12-STD-D-S-C-EW	**5700 SERIES SWITCHES AND 7500 SERIES SWITCHES**
USK12-STD-D-S-C-EW-3Y	**5700 SERIES SWITCHES AND 7500 SERIES SWITCHES**
USK12-STD-D-S-C-EW-5Y	**5700 SERIES SWITCHES AND 7500 SERIES SWITCHES**

4.5.10 Explain in detail the proposed warranty terms and any other warranty or maintenance options for BCSD's consideration. For example, clarify response times (i.e., 4-hour, 8- hour, next business day, etc.), onsite parts replacement, depot replacement, etc., and the associated cost for each option.

PCS and Extreme Networks is pleased to propose a comprehensive warranty and support solution designed to ensure high availability, predictable cost of ownership, and full E-Rate

compliance for BCSD's network infrastructure. The proposed coverage applies to all **Extreme Networks switches and wireless access points** included in this bid.

Core Switches (Extreme Networks 7520 Series)

For the core switching layer, PCS proposes **Next Business Day (NBD) Hardware Replacement** coverage (**Extreme SKU 97304**). Under this service, any verified hardware failure will trigger expedited shipment of a replacement unit for **next business day delivery**, minimizing downtime and maintaining operational continuity for BCSD's network core.

In addition, this service includes:

- **24×7 Technical Assistance Center (TAC)** support from Extreme Networks, providing expert troubleshooting, fault isolation, and configuration assistance.
- **Access to Operating System (OS) updates, feature releases, and security patches**, ensuring the network remains stable, current, and secure.
- **Online support tools and documentation**, including ExtremeCloud IQ resources and knowledge base access for efficient issue resolution.

This next-day replacement model ensures that BCSD's most critical network components receive the fastest possible turnaround and enterprise-grade support.

Edge Switches and Wireless Access Points (Extreme Networks 5520 / 5720 and Wireless Products)

For all proposed edge switches and wireless access points, PCS and Extreme Networks recommend coverage under the **Extreme K-12 100% E-Rate Eligible Technical Assistance Center (TAC) and Operating System / Right-to-Use (RTU) License** program. This program delivers continuous software and support coverage while maximizing the district's ability to fund these services under E-Rate guidelines.

This E-Rate eligible support includes:

- **Unlimited 24×7 access to Extreme TAC** for remote technical assistance.
- **Full entitlement to software and firmware updates**, including major OS upgrades and feature enhancements.
- **Right-to-Use (RTU) licensing** for all applicable software features for the life of the device.
- **Proactive maintenance and security patching**, ensuring long-term operational integrity.

By leveraging the K-12 TAC and OS/RTU License program, BCSD benefits from comprehensive technical coverage at the lowest eligible cost.

Extreme Networks Limited Lifetime Warranty (LLW)

All proposed Extreme Networks hardware is covered under **Extreme's Limited Lifetime Warranty**, providing long-term protection and investment assurance. The LLW includes:

- **Lifetime hardware replacement** for as long as the original end-user owns the product and it remains under active sale or support.
- Coverage for **field-replaceable components** such as power supplies and fans under normal operating conditions.
- **Access to maintenance and bug-fix software** necessary to maintain product stability and compatibility.
- Standard **Return Merchandise Authorization (RMA)** processing, with advanced replacement available through the selected TAC or NBD programs.

When combined with the proposed support services, the LLW ensures BCSD's network hardware is protected throughout its life cycle, with both rapid response and manufacturer-backed replacement coverage.

Optional Enhanced Service Levels

PCS can also provide optional **4-Hour Advanced Replacement** or **On-Site Response** coverage for districts requiring faster SLAs or localized hardware staging. Pricing for these enhanced maintenance options can be provided separately for BCSD's consideration.

Summary

This warranty and maintenance plan delivers a complete, tiered protection strategy for BCSD:

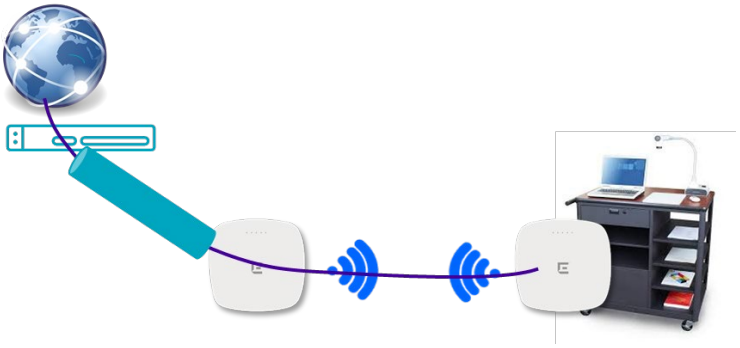
- **Core Switches:** Next Business Day Replacement (SKU 97304) with full TAC and OS support.
- **Edge and Wireless:** K-12 100% E-Rate Eligible TAC and OS/RTU License for continuous support and upgrades.
- **All Hardware:** Covered under **Extreme Networks' Limited Lifetime Warranty**, ensuring long-term reliability and protection.

Together, these programs provide BCSD with enterprise-grade support, cost efficiency, and compliance with E-Rate funding requirements, while ensuring the district's network remains reliable, secure, and up to date for years to come.

For more warranty information, please visit:
https://www.extremenetworks.com/support/policies

4.5.11 Provide solution(s) for wireless bridging that can be used in un-common situations to join a building to the LAN/WAN with Wi-Fi technology. Give description(s), model(s), and other information here and provide models and pricing in pricing section. Include "hardened" access point models and accessories such as antennas and Wi-Fi enclosures in description and pricing section.

RESPONSE: Currently the proposed ExtremeWireless solution with the associated Wi-Fi 6 and Wi-Fi 6E WAPs supports the AP Client Bridge topology providing the ability to extend the wired LAN using a wireless network. The Client Bridge can be used to tunnel network traffic to the Extreme Cloud Controller, enabling connectivity for wired devices that are moved around a facility. For example, an educational device that is moved between classrooms can maintain connectivity to the Extreme Cloud Controller through a WAP radio configured as the uplink. The educational device moves with the Client Bridge AP, the two devices can be connected through the GE2 wired port or through a wireless connection.



The solution includes one or more infrastructure WAPs that are deployed for standard service offering. After provisioning, the Client AP connects to normal infrastructure services. The infrastructure WAPs communicate with the Extreme Cloud Controller supporting the usual traffic flow. The Client Bridge AP roams like a wireless client, supporting background scanning to determine available infrastructure WAPs, Fast Roaming (11r), and Fast Client Handover to the infrastructure WAP. The Client Bridge AP associates on the infrastructure WAP SSID (using network credentials) establishing a Client Bridge link with the infrastructure. The Client Bridge AP and its end-system clients are managed from the Extreme Cloud Controller. Client statistics that

are tunneled through the Client Bridge are visible from the Extreme Cloud Controller Dashboard.

At least one radio on the Client Bridge AP must be specified as Client Bridge. The second radio can forward traffic allowing you to configure the second WAP radio as dedicated WLAN, radio share, or sensor, depending on the WAP model type. All ExtremeWireless Wi-Fi 6 an Wi-Fi 6E WAPs provide support for AP Client Bridge functionality, provided that the AP operational mode is configured for a Centralized site. Both the Client Bridge AP and the infrastructure WAP must be an 802.11ax WAP model: AP460xxx, AP5050xx.

4.6 NETWORK MANAGEMENT

4.6.1 Describe in detail the make, model, architecture, features, version, and capabilities of the proposed network management system(s).

We recommend BCSD ***continue leveraging*** your existing Extreme SiteEngine as your network management system. Extreme SiteEngine will support the newly proposed Extreme solution elements as well as existing equipment, providing consistent management across all devices – from a single-pane-of-glass console and a single global database. Extreme SiteEngine offers you all you need for data-driven insights, visibility and control with one view from the network edge to the data center.

Extreme SiteEngine is the glue that connects all hardware and software components together – empowering you to deliver a superior quality of experience to your staff and students and increase operational efficiencies. This powerful tool enables both managers and technical staff to be more efficient in their provisioning, monitoring, reporting, analysis, troubleshooting, and problem-solving tasks. At-a-glance dashboards streamline network monitoring with consolidated status of all the devices and the ability to drill down for finer detail. State-of-the-art reporting provides historical and real-time data for high level network summary information and/or details. The reports and dashboard views are interactive, allowing users to choose the specific variables they need when analyzing data.

Furthermore, Extreme SiteEngine enables BCSD to take full advantage of the enhanced features and functionality of the proposed Extreme solution. It enables easy role-based policy enforcement network-wide providing all the management tools you need to control policy and deliver the appropriate network experience for each user/device in the District. Extreme SiteEngine is distinctive for granularity that reaches beyond ports, VLANs, and SSIDs down to individual users, applications, and protocols. No matter how many moves, adds, or changes occur in your environment, Extreme SiteEngine keeps everything in view and under control through role-based access controls. One click can equal a thousand actions when you manage your network with Extreme SiteEngine. You can even manage beyond Extreme solutions to deliver standards-based control of other vendors' network equipment. As a complete standards-based solution, Extreme SiteEngine can manage all network equipment that is SNMPv1, SNMPv2, or SNMPv3 capable.

The major components of the Extreme SiteEngine solution are detailed below:

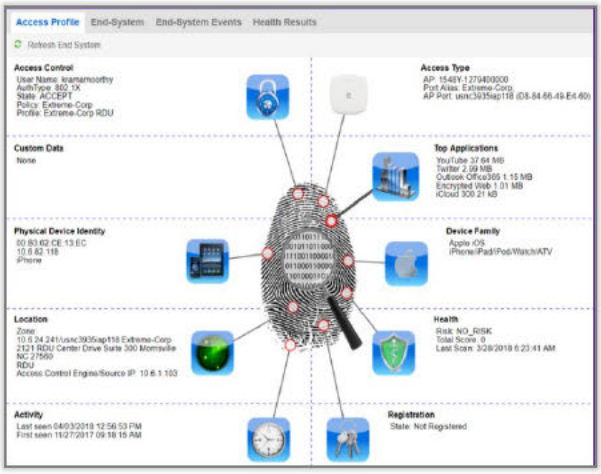
Extreme SiteEngine
Extreme SiteEngine offers a single-pane-of-glass view for your wired and wireless network providing a granular view of users, devices, and applications through easy to understand dashboards so you can efficiently manage inventory and network topology. Zero touch provisioning (ZTP+) support lets you quickly bring new infrastructure devices online. For example, the District's FabricAttach switches can be set up as a stack with ZTP+ which enables easy deployment and reduces deployment time. Extreme SiteEngine also allows you to automate repetitive tasks using various scripting and programming languages including TCL and Python. For example, a simple script can be written in minutes to provide a graphical administrative form that can perform common and repetitive tasks such as creating and deploying VLANs, creating and removing IP subnets/interfaces, and more. This is not only a more efficient and easier way to manage your network versus legacy CLI but is also less prone to error. Integrated Workflows allow you to automate complex tasks with a single click. Workflows are modeled as flow charts and can be configured to perform one set of actions that take place if an action occurs successfully and another set of actions that take place if the action does not occur successfully. System-defined workflows are available for all users, and with your existing SiteEngine, you can create your own workflows that can be scheduled or run ad-hoc.

Furthermore, together with ExtremeControl, described later, Extreme SiteEngine lets you unify the security of your network with in-depth visibility and control. Policies and new services such as BYOD can be enabled through the integrated interface of Extreme SiteEngine and enforced at the network point of entry through ExtremeControl.

ExtremeControl
ExtremeControl unifies the security of your network with the ability to manage secure and automated access for all devices connecting to the network – wired, wireless, BYOD, and IoT – from one convenient dashboard. It lets you centrally define and roll out targeted policies across your network so you can meet regulatory compliance obligations. With one click you can enforce context-driven policies across devices for QoS, bandwidth, and other parameters enabling granular controls over who, what, when, where, and how endpoints are allowed on the network. Role-based identities follow a user, no matter from where or how the user connects to the network. ExtremeControl also offers end-system security posture assessment as a

separately licensed option that includes agent-based and agentless assessment.

ExtremeControl provides the ability to quickly view the state of the network environment. Network administrators can quickly see who and what is attaching to the network; where and at what time the devices are connecting; if the devices are safe and secure; and if the users are posing any threat to the network environment. The ExtremeControl dashboard displays a summary including end-system data, system-level information, system events, and ExtremeControl engine information, with interactive charts and graphs for further details. A unique end system table contains all the available details about connected systems solving a range of IT issues from troubleshooting user access to quickly identifying types of devices and how they authenticated to the network.

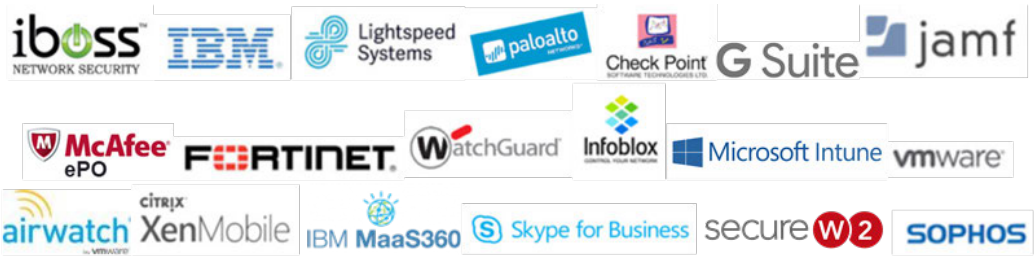


ExtremeAnalytics

ExtremeAnalytics provides business and security insight from the network edge to the data center through network powered application analytics. ExtremeAnalytics captures and analyses context-based application information to deliver meaningful intelligence about applications, users, locations, and devices enabling BCSD to optimize the network for improved performance and the stability of applications. ExtremeAnalytics combines flow-based technology with a rich set of application fingerprint techniques to detect and measure on-prem applications (SAP, SOA traffic, Exchange, SQL, etc.), public cloud applications (Google, email, YouTube, P2P, file sharing, etc.), and social media applications (Facebook, Twitter, etc.). ExtremeAnalytics is a tightly integrated extension of ExtremeControl and centrally managed through Extreme SiteEngine Advanced. When used together, the additional contextual information from ExtremeControl (such as user, role, device type, and location) is integrated with the network and application analytics flows providing a full understanding of the applications running on the network, who's using the application, the devices being used, and where they are located within the network. This granular visibility empowers you to make data-driven decisions to improve quality of user experience and optimization of the network.

ExtremeConnector

ExtremeConnect integrates with key enterprise platforms to streamline your business processes, enable more robust data analysis, and deliver seamless user experiences. BCSD can take advantage of ExtremeConnect to automate day-to-day operations through open APIs and integration with 3rd party services. Extreme has developed a number of predefined integrations that allow programmatic control of VM, MDM, web filtering, and firewall systems, but additional customer-defined integrations are always an option. Extreme offers integration with major enterprise platforms for network security, mobile management, analytics, cloud, and data center solutions – with the goal of enabling IT to better support business objectives. In addition, Extreme offers a comprehensive suite of open APIs from our network infrastructure portfolio of switches and wireless controllers. This includes the classical integration methods like SNMP, Syslog and more efficient integration methods like REST-based APIs.



The intelligence, automation, and integration provided by Extreme SiteEngine and Extreme CloudIQ enables IT departments to optimize the efficiency of network operations and reduce total cost of ownership. Extreme SiteEngine is a key component of Extreme's solutions and assures that network operations are aligned with the business, operationally efficient, and secure.

4.6.2 Does the proposed system integrate with any Mobile Device Management solutions. Explain in detail.

Yes. Extreme SiteEngine with ExtremeControl offers open APIs for integration with third party applications, including Mobile Device Management (MDM) solutions. MDM integration provides granular visibility into any mobile device connected to the network and enables enforcement of network policies for managed and unmanaged devices. It also improves device and location tracking capabilities by enriching SiteEngine's real-time database with information like phone number, device model,

OS version, mobile provider, IMSI, IMEI, and more. In addition, MDM integration enables devices and users to be quickly located and services to be rapidly delivered without the need to discover network attributes like MAC and IP. Key MDM integration partners include: Jamf Software, Airwatch by VMware, MobileIron, and IBM MaaS360; customers can also develop their own custom-integrations simply and easily via the open API.

4.6.3 Explain how Network Access Control is implemented. Is it native to the proposed system or is it provided and integrated with another third-party product? Explain in detail.

Network Access Control functions are built into the proposed wired and wireless solution leveraging Extreme's embedded role-based policy enforcement capabilities. Extreme's role-based policy enables BCSD to define distinct roles or profiles that represent specific operational groups that exists within your environment (e.g., administrator, teacher, student, contractor, visitor, etc.). Each defined role is granted individualized access to specific network services and applications, and these access privileges remain associated with each user/device as they move across the network.

The role-based policy capabilities of the proposed hardware are further enhanced and augmented by leveraging your existing ExtremeControl solution which delivers extensive authentication, registration, and remediation capabilities. ExtremeControl, a tightly integrated component of Extreme SiteEngine enables you to unify the security of your entire network. The ExtremeControl solution provides a complete standards-based, multi-vendor interoperable network access control solution for all clients attaching to the network – wireless, VPN, and wired. ExtremeControl's context-based policy engine controls network usage based on up to 50 factors; access restrictions can be based on Layer 2/3/4 attributes (i.e. Source/Destination MAC address, IPv4 Source/Destination IP address, Source/Destination Layer 4 port, IPv4 Source/Destination socket (IP address + port), IP type, ICMP packet type & code, TOS/DSCP marking, 802.1p priority, Ethertype), VLAN/SSID, time, location, authentication types, device and OS type, and end system and user groups. For example, BCSD can write and enforce policies that grant a precise level of network access based on the type of system connecting, the user's role in the District, the location of a user at the time the user is connecting, or the time of day.

4.6.4 Explain the proposed licensing structure, if any, for the proposed network management system.

Extreme SiteEngine is highly flexible and scalable offering virtual appliances and a range of models and licenses to meet the needs of different sized deployments. We recommend BCSD continue leveraging the Extreme SiteEngine K-12 licensing, which includes Platform, and AI. SiteEngine is included with the K-12 Right-to-Use Licenses.

4.6.5 Does the proposed network management system have the ability to distinguish between a district owned device and a non-district device? Explain in detail.

Yes, this capability is a function of ExtremeControl. We recommend BCSD continue to leverage your existing ExtremeControl solution for complete visibility and control over district owned devices and non-district devices (BYOD). ExtremeControl fully integrates with the proposed ExtremeSwitching and ExtremeWireless solutions to securely facilitate BYOD programs in your schools and protect your network against external threats. ExtremeControl lets you centrally manage and define granular policies so you can meet compliance obligations, locate, authenticate and apply targeted policies to users and devices – district owned and non-district owned. You can apply granular controls over who, what, when, where, and how endpoints are allowed on the network by rolling out real-time policies. ExtremeControl configuration options provide an unparalleled range of choices for fine grained network control and include time, location, authentication types, device and OS type, and end system and user groups. For example, BCSD can write and enforce policies that grant a precise level of network access based on the type of system connecting, the user's role in the District, the location of a user at the time the user is connecting, or the time of day. Device and OS type rules are particularly important in BYOD environments; the District can give these devices network access that is different than the access permitted district owned devices.

4.6.6 Describe how the proposed network management system integrates with AD. Explain in detail.

Authentication to Active Directory is done via RADIUS proxy and relies on a RADIUS server, or authentication server, on the network to provide the authentication information. ExtremeControl has proven integration with Microsoft Active Directory, Open LDAP, eDirectory, Open Directory, and Red Hat Directory Server.

The proposed Extreme solution, with its support for role-based policy, delivers unmatched value to BCSD enabling the assignment of rules and roles per user/device/application (not just to a specific VLAN) seamlessly across all wired and wireless access devices. Network communications rules can be effectively enforced for all users with access to specific resources being limited or controlled based on the user's role (faculty, staff, student) in the network.

4.6.7 Should the district's existing RADIUS servers be utilized in the proposed configuration. If so, explain in detail. What are the benefits and risks?

Yes. We recommend BCSD continue to leverage your existing RADIUS servers. The proposed solution will act as a RADIUS proxy to communicate with the districts existing RADIUS servers, protecting previous investments. ExtremeControl operates within the defined RADIUS standards. When proxying RADIUS authentication requests, the ExtremeControl solution can interoperate with any existing standards-based RADIUS server on the network.

4.6.8 Explain with detail how the proposed network management system implements policy-based network control.

The recommended Extreme solution is differentiated by a patented policy framework enabling unified network-wide application policy control and provisioning. Leveraging the previously described role-based policy features embedded within the proposed access edge switches and access points users/devices can be authenticated (via IEEE 802.1X, MAC address, or web authentication) and then assigned a pre-defined operational role. Extreme's role-based policy enables BCSD to define distinct roles or profiles that represent specific operational groups that exists within your environment (e.g., administrator, teacher, student, contractor, visitor, etc.). Each defined role is granted individualized access to specific network services and applications and these access privileges remain associated with each user/device as they move across the network. Extreme SiteEngine's Policy feature enables the creation and deployment of role-based policies that dynamically control user access, network security, application prioritization and other parameters. Key benefits of the Extreme policy solution include centralized provisioning and local edge enforcement – Extreme SiteEngine plays a role in the definition of the policy profiles and the actual traffic management occurs on Extreme's policy-enabled switches, access points, and controllers.

Within the Extreme SiteEngine Policy configuration tab, you can create policy profiles, called roles, assigned to the ports in your network. These roles provide four key policy features: traffic containment, traffic filtering, traffic security, and traffic prioritization. When authentication is enabled, users identify themselves to the network and are given customized access capabilities based on the role they serve in the organization. Using the Extreme SiteEngine Policy configuration tools, you can create multiple roles tailored to your specific needs and set a default role for all or some of your network devices and ports. Basic Policy operations include creating, editing, and deleting roles. You can also view role configuration on a per device and per port basis. In addition, the Policy tab allows you to verify the roles enforced on your network device match the roles currently configured in the application.

4.6.9 Does the proposed network management system have the ability to black-list specific devices by MAC address and restrict by SSID? Explain in detail.

Yes. ExtremeControl support the ability to blacklist specific devices, as well as restrict devices by SSID. One of the core functionalities of the ExtremeControl solution is the ability to control the access permissions of an end system on the network. The ExtremeControl solution is designed to apply the control of the end system as close to the edge of the network as possible. If the device is wireless, it will assign the access permissions at the wireless access point. If the device is wired, it will assign it on the switch port specifically to that device and to other devices attached to it (i.e. a phone with a computer attached behind it). There is a rules engine that determines the type of access a device should have as well as how to assign the access.

The ExtremeControl rules engine is a logic engine that evaluates end systems connecting to the network in order to assign a level of access. The rules are an evaluation of a logical 'AND' between multiple rule components. If the end system matches the combination of rule components it is assigned a Profile. The Profile has an Access Policy which the user is assigned as well as an assessment configuration if assessment is in use. The rules are evaluated in a top-down fashion similar to ACLs. If an end system does not match the first rule, it is evaluated against the next rule in the list and so on. At the bottom of the rules list is a catchall rule that will match any end system.

Rule group categories are comprised of the following types of objects:

- User Groups (LDAP, RADIUS, username)

- End System Groups (A list of MAC Addresses or MAC OIU, IP addresses, Hostnames, etc.)
- Locations (A list of switches, switches and ports, or switches and SSIDs)
- Device Types (A list of Device Types)
- Time Groups (Time of week)

End System Group rule components tend to be one of the most commonly used rule components within the rules engine. These groups are used to match the physical end system versus the user attached to the end system. Many default rules groups already exist, including a Blacklist group, end-systems can be blacklisted after failing an assessment or be blacklisted easily with a single click. ExtremeControl Access Policies can also restrict users to a specific SSID.

Furthermore, Extreme's solution architecture enables inclusion of the distributed firewalls into the system through the open API. BCSD can leverage the existing Extreme SiteEngine Advanced license, which includes the ExtremeConnect API, to easily integrate with best-in-class next-generation firewalls. Extreme's proven interoperability with third-party firewalls is an important factor for BCSD to consider, if not already being utilized, as you design and plan for your network infrastructure upgrade. The two key functions of the integration include:

- Providing User-ID information to the next-generation firewall to be used in its firewall rules
- Enabling ExtremeControl to be notified of a threat detected by the next generation firewall. ExtremeControl will take that information and blacklist the device at the edge port so that it cannot transmit the vulnerability over the network

Extreme's integration extends firewall policies inside the BCSD network to mitigate threats originating inside the firewall, and dynamically maps users-to-IP addresses as devices enter and exit the network to create higher accuracy for policy enforcement and reporting. Our solution ensures fine-grained user and application control to the network edge, threats or malicious packets originating from internal users can be detected by the firewall which will report the source IP address to Extreme SiteEngine which can block/limit a user network access while other users stay unaffected, even on the same port. The impacted user can remain locked until cleared, independent of attachment port, and administrators can be notified of the event via Captive portal, email, and SMS.

4.6.10 Does the proposed network management system have traffic shaping, traffic prioritization, and traffic management capabilities? Explain in detail.

Yes. Extreme SiteEngine together with Extreme's embedded role-based policy architecture can dynamically assign very granular policy rules of how the traffic will be handled (QoS priority, Class of Service, classification, bandwidth rate control, etc.) – on a per-device, per user, per application, and per-SSID basis.

As detailed in earlier responses, within the Extreme SiteEngine Policy tab you can create policy profiles, called roles, for securing and provisioning network resources based upon the role the user or device plays within the network. These roles are based on the existing functions in your district and consist of services that you create, made up of traffic classification rules. A policy role can be configured for any combination of Class of Service, VLAN assignment, or default behavior based upon Layer 2, Layer 3, and Layer 4 packet fields. Hybrid authentication allows either policy or dynamic VLAN assignment, or both, to be applied through RADIUS authorization. Extreme SiteEngine centralizes all of the policies; automating the definition, distribution, and enforcement of policy rules across the entire network – administrators can define policies once and then automatically enforce them on all Extreme policy-enabled infrastructure devices – wired and wireless – with a single mouse click.

Roles provide four key policy features: traffic containment, traffic filtering, traffic security, and traffic prioritization. When authentication is enabled, users identify themselves to the network and are given customized access capabilities based on their role, which are designed to reflect different users in your district. For example, student and faculty have different network access and priority needs and therefore may have different roles. Services are sets of rules that define how network traffic for a particular network service or application should be handled by a network access device. A service might consist of only one rule governing, for example, email priority, or it might consist of a complex set of rules combining class of service, filtering, rate limiting, and access control (VLAN) assignment. Policy rules define one element of how traffic for a particular network service or application is handled by a network access device. For example, you might create a rule that assigns a certain priority to all email traffic, by adding an 802.1p, ToS, or DiffServ value to all SMTP traffic. A policy rule can be included in any number of services, and you can select the types of devices to which the rule applies.

This capability is very beneficial as it provides the ability to identify what applications are passing through the network and then set controls to provide preference for critical applications, and rate limit or deny non-critical applications. Access can be granted for all users with access to specific resources being limited or controlled based on the user's role (administrator, teacher, student, visitor, etc.)

in the network. Once a user/device has authenticated, a policy that has been centrally defined it is pushed to the policy-enabled Extreme devices and enforced locally; distributing intelligence to the network edge. Policies define what is allowed and not allowed on the network, what priority a device, user, or application can have on the network, and how much bandwidth each are allowed to use.

4.6.11 Does the proposed network management system have application filtering, application prioritization, device filtering, and device prioritization capabilities? Explain in detail.

Yes. The proposed Extreme solution is differentiated by a patented policy framework enabling unified network-wide application policy control and provisioning. Leveraging the embedded capabilities of Extreme's role-based policy architecture, previously described, the district can effectively enforce the appropriate network communications rules for each application, regardless of SSID and VLAN, seamlessly across all access devices – wired and wireless. A policy can provide very granular control over what each application/user/device is allowed and not allowed to do on the network, their priority and bandwidth parameters.

The primary benefits of using Extreme's dynamic role-based policy in your network are provisioning and control of network resources, security, and centralized operational efficiency. Extreme's role-based policy provides for the provisioning and control of network resources by creating policy roles that allow you to determine network provisioning and control at the appropriate network layer, for a given user or device. The role can be created centrally using Extreme SiteEngine which provides the ability to define very granular policy rules of how the traffic will be handled, up to the application layer. For example, the proposed ExtremeXOS switches support a Layer 7 policy feature which allows you to associate an application signature to a policy profile. As previously detailed, policy rules are used to assign incoming traffic to a specific policy profile and this feature allows policy rules to have an additional traffic classification of application signature group and name. There is a fixed, defined set of signature groups available. Each group has a subset of pre-defined/built-in signature names (i.e. Facebook, Google); these can be enhanced with additional ones that can be created by commands or MIB. ExtremeWireless adds Layer 7 visibility and control for over 3,000 applications, which is made possible through the flow-based architecture of the ExtremeWireless Access Points which allows them to perform deep packet inspection (DPI) without impacting WAP traffic processing. This capability allows you to identify what applications are passing through the WAPs and then set controls to provide preference for critical education applications, and rate limit or deny non-education

applications. Traffic can also be classified based on Layer 2/3/4 attributes which include: Source/Destination MAC address, IPv4 Source/Destination IP address, Source/Destination Layer 4 port, IPv4 Source/Destination socket (IP address + port), IP type, ICMP packet type & code, TOS/DSCP marking, 802.1p priority and Ethertype.

4.6.12 Does the proposed network management system provide a spectrum analysis in graphical form of the wireless systems installed in the buildings? Explain in detail.

Yes. The Extreme SiteEngine Advanced Maps feature, provided with the District's existing Extreme CloudController license, lets you view and search geographic and topology maps of the devices and floor plans of WAPs on your network. The solution provides wireless coverage maps to identify coverage trouble spots for your Extreme wireless network. You can upload and modify existing floor plans, create new floor plans from scratch, or import Ekahau maps. The Map feature supports images in the .png, .gif, and .jpg formats. In the floor plan design feature, you can use the map drawing tools to draw walls (or other objects) over an existing map image or on a blank canvas. The user-definable criteria include access point height, wall thickness/type, access point location, access point orientation, etc. Extreme Cloud Controller wireless coverage feature provides a graphical view of wireless coverage, allowing quick identification of possible coverage trouble spots. Wireless coverage is displayed using different colors to indicate radio signal strength based on the distance from access points included on the map. Coverage is determined by computing the approximate radio signal strength at fixed distances from access points, with floorplan and wall information used to provide accuracy in the signal strength computation. Multiple options are available for displaying wireless coverage including: Signal Strength, Channel Coverage, Data Rate, and Location Readiness.

Furthermore, the proposed Extreme CloudController solution includes an integrated locationing analytics and management system providing visibility into heatmapping and locationing coverage. You can use floor plans to visualize a wireless deployment, plan device placement, and troubleshoot network performance issues. The floor plan illustrates how the location of the WAP affects network performance and illustrates WAP location within a floor plan. Floor plans retrieve a list of all WAP and associated clients on the system with their current configurations. Visualization of WAP performance is based on signal strength and channel assignment. The Extreme Cloud Controller solution provides overall performance of your WLAN by providing details views of the RF State, including: RxRate, TxRates, RSS, WirelessRTT and NetworkRTT. The solution also includes a unique RF Quality Indicator

(RFQI) which assigns a multi-dimensional score to how well a particular WAP is serving its associated clients and paints it over the WAP's coverage area. Additional diagnostic tools to help troubleshoot the network include Network Utilities to test a connection to the target IP address Packet Capture to identify network inconsistencies by intercepting packets from the WAP.

4.6.13 Explain the reporting capabilities of the proposed network management system.

Extreme SiteEngine Reports provide historical and real-time reporting, offering high-level network summary information as well as detailed reports and drill-downs, as well as comprehensive Dashboards for at a glance monitoring. BCSD can select from an extensive catalog of pre-defined reports, many of which are interactive allowing you to adjust the data and time on which to report, or you can create your own custom report by selecting a specific target type (such as Interface or ExtremeControl end-system) and a statistic based on the selected target. Administrator can build a number of custom reports that can be run real-time from an archived database or at a schedule time on a daily, weekly, and/or monthly interval. To further add value, the reports can be scheduled and emailed to various stake holders on a regular basis. CSV Export is also supported providing the ability to save report data to a file in CSV format to provide report data in table form.

The Reports catalog lets you select a report from the following report types:

- **Access Control** – Provides an overview of end-system connection information.
- **Access Control Health** – Provides reports on end-system assessment and state information. In the Risk Level pie chart, click on a pie section to open a filtered end-system grid for more detailed information about end-systems at that risk level.
- **Application Analytics** – These reports provide visibility into the applications on your network and who's using those applications.
- **Application Telemetry** – Provides reports on interfaces, clients, and applications.
- **Data Center** – These reports provide an overview of all virtual machines on the network broken down into VM distribution per ExtremeControl profile, Operating System, Switch, and Hypervisor technology. They also provide table reports with detailed information on all VMs. For each supported Hypervisor technology, sub reports provide more in-depth data.

- **Device** – The Device reports provide information on device alarms, device archives (archive events and details), device availability, potential duplicate devices, down devices, port usage and details, devices removed from service, top devices by IP traffic, top hosts by resource (memory, CPU, and disk usage), top switches by power (percent usage and consumption in watts), and top switches by resource (CPU and physical memory).
- **End-Systems** – These reports present information on the end-systems connecting to your network.
- **Policy** – Provides a policy rule hit summary report showing top services and roles by rule hits.
- **Ports** – Provides information about the most utilized ports on your network by bandwidth, flows, PoE usage, as well as those that are least available.
- **Server** – These reports provide data on the Extreme SiteEngine server, including the Event Log, CPU and heap memory utilization, and disk access information. The information in the Console Event Log report is the same as the Alarms and Events tab.
- **VoIP** – Provides a report about calls made via Skype for Business.
- **Wireless** – A collection of summary reports providing information on your wireless network components, including reports for AP groups, APs, clients, controllers, and mobility zones. Wireless reports also provide data on wireless components ranked by bandwidth and clients, such as top APs by bandwidth, top clients by bandwidth, and top controllers by clients, as well as reports on APs and controllers that are down. For convenience, you can also view some of these reports from the Wireless tab.
- **PDF Reports** – Generate summary reports of your current network configuration in PDF format including a Console Report, Network Status Summary, Inventory Report, ExtremeControl Summary, and Wireless Configuration Report. You can save these reports or send them to other users in the organization.

4.6.14 Does the proposed network management system provide device tracking? Explain in detail.

Yes. Extreme SiteEngine with ExtremeControl supports the ability to track users and devices over time by identifying where they are currently connected to the network, including at any given time in the past. This information is useful for compliance and auditing purposes, as well as other management operations that require complete visibility into the current and

historical connections of devices and users. The authentication and authorization data is performed by the ExtremeControl engine which then sends the data upstream to the Extreme SiteEngine Server that aggregates all the data from ExtremeControl appliance(s) deployed. Aggregated data includes the most recent authentication and authorization as well as previous authentications and authorizations for tracking and reporting purposes. The SiteEngine database tracks all client devices from the initial association request all the way through the end of the session.

4.6.15 Does the proposed network management system allow importing MAC address, single or in batch? Explain in detail. Clarify what electronic file formats are supported.

Yes. ExtremeControl allows you to import MAC addresses from a file for viewing and assigning them to various end-system groups. The file entries must specify a MAC address and (optionally) an end-system group name and a description in the following format:

MAC address,end-system group name,description

For example:

00:00:1D:00:00:00,Registered Guest,Imported MAC

The information in the file must be listed in CSV format, one line per device (i.e: 02.0A.40.0B.01.44, value1, value2, value3, value4). MAC addresses without separators are allowed, as well as addresses that use spaces, colons, periods, or dashes as separators. The end-system group, if included, must already be defined in ExtremeSite Engine or it is not imported.

4.6.16 Wireless network must support and be configured for Active Directory integration with captive portal and sponsored onboarding for guest devices. Solution needs to be configured to support the assignment of policy and application control based on user and/or type of device. All of these features must be configurable with one SSID. Solution must be configurable to provide granularity that reaches beyond ports, VLANs and SSIDs down to the individual users, applications, and protocols. Solution must include a search feature that allows end systems to be searchable by port, MAC address and IP or IP/Port. Configuration to enforce policies network-wide for QOS, bandwidth, etc. Does your system do this? Explain.

Yes. The proposed ExtremeWireless solution together with ExtremeControl provides a self-registration portal for users to register multiple devices themselves offers advanced sponsorship capabilities such as email

sponsorship and a simple portal for sponsors to use to validate guest registration. Registration capabilities are also available for automatic contact verification through SMS or email, secure wireless guest access providing access to the secured wireless network without an 802.1X certificate or involving any IT intervention. Active Directory/LDAP integration allows dynamic role assignment for authenticated registration. Authenticated registration allows network users to register devices and receive the proper role for non-802.1X capable devices. Multiple registration groups allow administrators to give different levels of access to different types of guests. Location based registration allows guest access to be limited to specific connection points (SSID, port, switch) or group of connection points. Leveraging Extreme's role-based policy architecture BCSD can effectively enforce the appropriate network communications rules for each user, including guests, regardless of SSID. Access can be granted for all users with access to specific resources or applications being limited or controlled based on the user's role in the network. Once a user/device has authenticated a policy that has been centrally defined it is pushed to the ExtremeWireless access point and enforced locally; distributing intelligence to the network edge. The policy management capabilities within ExtremeControl enable "one click" network-wide enforcement of role-based access rules controlling QoS, priority, bandwidth, and security. The policy is not tied to a VLAN or SSID, it is associated with the user/device and will follow that user/device as they roam throughout the network. With policies you have the capability of distinguishing between different systems and services, and there is no need for separation with VLANs.

Search functionality is also supported with the proposed Extreme solution. Extreme SiteEngine's Search feature is a powerful diagnostic tool for locating a network device or end-system you wish to troubleshoot by allowing you to display it in PortView. You can search by MAC address, IP address, or AP serial number, as well as ExtremeControl end-system name, username, and registration custom field attributes. Additionally, you can search for a device in a map, or perform a Compass search. A device must be in the Extreme SiteEngine database, or it must be a client of a device in the database, for the search to function. For a client device, either statistics collection must be enabled for the device, or the client must be an ExtremeControl authenticated client.

4.6.17 Explain in detail the proposed licensing structure for the network management system.

Extreme SiteEngine is highly flexible and scalable offering virtual appliances and a range of models and licenses to meet the needs of different sized

deployments. We recommend BCSD continue leveraging the Extreme SiteEngine K-12 licensing, which includes Platform, and AI. SiteEngine is included with the K-12 Right-to-Use Licenses.

ExtremeControl, Extreme's on-premise network access control solution, is also existing and is based on number of connected end-systems. The number of end-systems is determined by the number of unique MAC addresses that are authenticated within a 24-hour period. The ExtremeControl solution is highly flexible with physical and virtual appliances available, and a scalable range of license models available to meet the needs of different sized deployments. If additional ExtremeControl licenses, over what the District already owns are required, they can easily be added to your existing system.

4.6.18 Clarify if the network management system runs on server hardware, appliances, or VM's. If it will operate on a VM, provide the complete VM requirements to be provided by BCSD.

BCSD currently has Extreme SiteEngine configured and running on their network. The district is using utilizing SiteEngine as their primary means for managing their switching. The district has SiteEngine installed on a local VM. The district would not have to reinstall this in their network.

Below are the VM requirements for SiteEngine.

Operating System Requirements

ExtremeCloud IQ Site Engine Server Requirements

Manufacturer	Operating System
Linux	Red Hat Enterprise Linux 9.4
VMware® (ExtremeCloud IQ Site Engine Virtual Engine)	VMware ESXi™ 6.0 server VMware ESXi™ 6.5 server VMware ESXi™ 6.7 server VMware ESXi™ 7.0 server VMware ESXi™ 8.0 server vSphere (client only)™
Microsoft® Hyper-V (ExtremeCloud IQ Site Engine Virtual Engine)	Windows® Server 2016 Windows® Server 2019
Nutanix (ExtremeCloud IQ Site Engine Virtual Engine)	AHV: 20230302.101026 AOS: 6.8.1 Prism Central: 2024.2
Extreme Networks	Universal Compute Platform 2130C version 5.09.01

These are the operating system requirements for the ExtremeCloud IQ Site Engine server.

ExtremeCloud IQ - Site Engine Server and Client Hardware Requirements

These are the hardware requirements for the ExtremeCloud IQ - Site Engine server and ExtremeCloud IQ - Site Engine client machines.

NOTES: ExtremeControl and ExtremeAnalytics are not supported on Small ExtremeCloud IQ - Site Engine servers.

ExtremeCloud IQ - Site Engine Server Requirements

	Small	Medium	Enterprise	Large Enterprise
Total CPUs	1	2	2	2
Total CPU Cores	8	16	24	24
Memory	16 GB	32 GB	64 GB	64 GB
Disk Size	240 GB	480 GB	960 GB	1.92 TB
IOPS	200	200	10,000	10,000
Recommended scale based on server configuration:				
Maximum APs	250	2,500	25,000	25,000
Maximum Wireless MUs	2,500	25,000	100,000	100,000
Maximum Managed Devices	100	1,000	10,000 air gap 8,000 connected	10,000 air gap 8,000 connected
ExtremeControl End-Systems	N/A	50,000	200,000	200,000
Statistics Retention (Days)	90	180	180	360
ExtremeAnalytics	No	Yes	Yes	Yes
MU Events	No	Yes	Yes	Yes

IMPORTANT: For optimal performance the CPU and Memory needs to reserved in the ESX Client and the virtual machine needs to be deployed using Thick Disk provisioning.

4.6.19 Explain in detail the proposed warranty terms and any other warranty or maintenance options for BCSD's consideration. For example, clarify response times (i.e., 4-hour, 8-hour, next business day, etc.), onsite parts replacement, depot replacement, etc., and the associated cost for each option.

PCS and Extreme Networks is pleased to propose a comprehensive warranty and support solution designed to ensure high availability, predictable cost of ownership, and full E-Rate compliance for BCSD's network infrastructure. The proposed coverage applies to all **Extreme Networks switches and wireless access points** included in this bid.

Core Switches (Extreme Networks 7520 Series)

For the core switching layer, PCS proposes **Next Business Day (NBD) Hardware Replacement** coverage (**Extreme SKU 97304**). Under this service, any verified hardware failure will trigger expedited shipment of a replacement unit for **next business day delivery**, minimizing downtime and maintaining operational continuity for BCSD's network core.

In addition, this service includes:

- **24×7 Technical Assistance Center (TAC)** support from Extreme Networks, providing expert troubleshooting, fault isolation, and configuration assistance.
- **Access to Operating System (OS) updates, feature releases, and security patches**, ensuring the network remains stable, current, and secure.
- **Online support tools and documentation**, including ExtremeCloud IQ resources and knowledge base access for efficient issue resolution.

This next-day replacement model ensures that BCSD's most critical network components receive the fastest possible turnaround and enterprise-grade support.

Edge Switches and Wireless Access Points (Extreme Networks 5520 / 5720 and Wireless Products)

For all proposed edge switches and wireless access points, PCS and Extreme Networks recommend coverage under the **Extreme K-12 100% E-Rate Eligible Technical Assistance Center (TAC) and Operating System / Right-to-Use (RTU) License** program. This program delivers continuous software and support coverage while maximizing the district's ability to fund these services under E-Rate guidelines.

This E-Rate eligible support includes:

- **Unlimited 24×7 access to Extreme TAC** for remote technical assistance.
- **Full entitlement to software and firmware updates**, including major OS upgrades and feature enhancements.
- **Right-to-Use (RTU) licensing** for all applicable software features for the life of the device.
- **Proactive maintenance and security patching**, ensuring long-term operational integrity.

By leveraging the K-12 TAC and OS/RTU License program, BCSD benefits from comprehensive technical coverage at the lowest eligible cost.

Extreme Networks Limited Lifetime Warranty (LLW)

All proposed Extreme Networks hardware is covered under **Extreme's Limited Lifetime Warranty**, providing long-term protection and investment assurance. The LLW includes:

- **Lifetime hardware replacement** for as long as the original end-user owns the product and it remains under active sale or support.
- Coverage for **field-replaceable components** such as power supplies and fans under normal operating conditions.

- **Access to maintenance and bug-fix software** necessary to maintain product stability and compatibility.
- Standard **Return Merchandise Authorization (RMA)** processing, with advanced replacement available through the selected TAC or NBD programs.

When combined with the proposed support services, the LLW ensures BCSD's network hardware is protected throughout its life cycle, with both rapid response and manufacturer-backed replacement coverage.

Optional Enhanced Service Levels

PCS can also provide optional **4-Hour Advanced Replacement** or **On-Site Response** coverage for districts requiring faster SLAs or localized hardware staging. Pricing for these enhanced maintenance options can be provided separately for BCSD's consideration.

Summary

This warranty and maintenance plan delivers a complete, tiered protection strategy for BCSD:

- **Core Switches:** Next Business Day Replacement (SKU 97304) with full TAC and OS support.
- **Edge and Wireless:** K-12 100% E-Rate Eligible TAC and OS/RTU License for continuous support and upgrades.
- **All Hardware:** Covered under **Extreme Networks' Limited Lifetime Warranty**, ensuring long-term reliability and protection.

Together, these programs provide BCSD with enterprise-grade support, cost efficiency, and compliance with E-Rate funding requirements, while ensuring the district's network remains reliable, secure, and up to date for years to come.

For more warranty information, please visit:
https://www.extremenetworks.com/support/policies

4.6.20 Explain how your proposed solution addresses Bonjour such as printing, packet distribution, routing, and control.

The Extreme solution leverages the policy-based capabilities of our solution and distributed intelligence at the Extreme WAPs to efficiently handle bonjour traffic. Policy definition can identify Bonjour and steer to specific VLAN. For services like Bonjour, for example, this method adheres to the original design of the applications services, contain the traffic to a single domain; thus, minimizing any performance or bandwidth issues, while providing the flexibility of allowing users access to these services regardless of where they are located on the network. Importantly, the solution provides support without requiring any additional components on the network, such as a dedicated Gateways.

4.7 WIRELESS CONTROLLERS

4.7.1 Describe in detail the make, model, architecture, features, and capabilities of the proposed wireless controller(s).

BCDS currently has the Extreme CloudController, VE6215 deployed within their network. The Extreme CloudController platform was purpose-built to provide complete architectural and deployment flexibility supporting a range of capacity and deployment options to ensure ease of scalability. Comprehensive capabilities for critical network services and connectivity are all provided through a single platform, including centralized management, secure network access control, integrated maps, historical data charts, session logging and accounting, programmable REST API, clustering support for load sharing and resiliency, and more. Built on a field-proven architecture with the latest technology, the controllers embedded operating system supports application containerization technology enabling the expansion of capabilities by simply installing add-on container applications. Extreme CloudController Docker Containers complement the native functionality delivering enhanced, custom solutions for network services, security, and more.

The Extreme CloudController incorporates extensive policy and control features as required to securely manage today's modern users and devices, including the ability to securely on-board BYOD or guest users with social media credentials. These powerful embedded policy and control features, through the application layer (L7), also ensures that devices are identified and securely segmented to prevent security breaches and leaks. Policy and QoS can be performed at the access point level for clients connecting to your Extreme wireless network. RF Characteristics can be automatically configured by the access point through automatic power or channel selection, likewise band-steering and airtime fairness are also controlled by the access point resulting in a responsive and highly efficient traffic flow. By building intelligence into the access point, the need to route all traffic through a central controller is eliminated, along with the resulting congestion and latency.

The solution also delivers seamless roaming within one geographic location and its high-availability architecture ensures dependability as required for real-time voice/video/data applications. The ExtremeWireless solution provides the same availability that everyone has come to expect with wired networks. Several levels of redundancy and failover mechanisms are included to ensure continuous network service in case of outages, all

integrated into the system with no additional costs. For example, controllers have built-in resiliency through the ability to pair wireless controllers together for full redundancy. If a controller happens to fail, the second controller can take over the full load while maintaining connectivity through the WAP. WAPs also coordinate with each other to provide optimized routing and self-healing, delivering a superior quality of experience for critical education applications.

Virtual Platforms

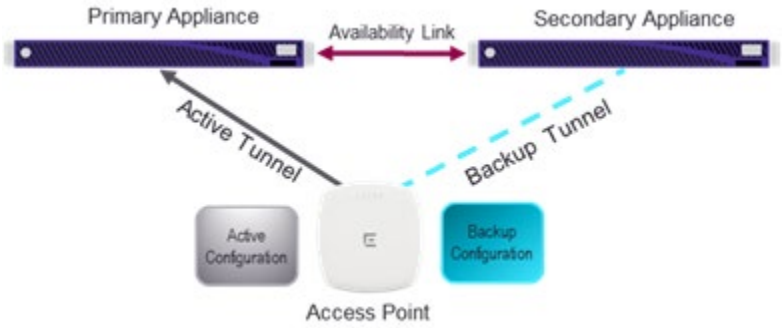
- **VE6125** (VMWare) – Extra-large capacity virtual appliance meeting the needs of large deployments. Supports up to 4,000 APs and 32,000 mobility sessions.

Supported Features	VE6215
Capacity	**X-Large**
Total APs Managed per Appliance Pair	4,000
Total APs managed in Standalone Mode	2,000
Additional APs supported in High-Availability Mode	2,000
Total Simultaneous Users Per Appliance Pair	32,000
Total Simultaneous Users in Standalone Mode Per Appliance	16,000
Additional Simultaneous Users in High-Availability Mode	16,000
Hardware Requirements	
CPU[1]	32[2]
RAM (GB)	32
Hard Disk (GB)	512
Maximum Throughput (Mixed RFC2544)[3]: Open / Encrypted with 2 x 1Gbps Host	TBD
Maximum Throughput (Mixed RFC2544)[2]: Open / Encrypted with 2 x 10 Gbps Host	TBD

4.7.2 **Is the wireless controller proposed in a true high availability (HA) configuration? Explain in detail. Also identify any redundant components.**

BCDS currently has the Extreme CloudControllers, VE6215 deployed within their network in High Availability.

BCSD has the Extreme CloudControllers configured as "availability pairs" operating in a load-sharing model which provides backup for all of the Access Points in the network and delivers true high-availability. Both Access Point and Client statistics are available on both sides of the High Availability configuration. The system operates in a load-sharing model which provide backup for all of the access points in the network. In session availability mode (shown below), the Wireless access points connect to both the primary and secondary controller. While the connectivity to the primary controller is via the “active” tunnel, the connectivity to the secondary controller is via the “backup” tunnel.



The following is the traffic flow of the topology illustrated in the figure above:

- The Access Point establishes the active tunnel to connect to the primary controller.
- The Extreme Cloud Controller sends the configuration to the access point. This configuration also contains the port information of the backup controller.
- On the basis of the backup controller port information, the Access Point connects to the backup controller via the backup tunnel.
- After the connection is established via the backup tunnel, the backup controller sends the backup configuration to the wireless access point.
- The access point receives the backup configuration and stores it in its memory to use it for failing over to the backup controller. During this entire time, the access point is connected to the primary controller via the active tunnel.

Access Points can be split between each of the paired controllers, balancing the load between the two controllers while providing fail-over redundancy. The secondary controllers are able to take over the full load enabling user sessions to continue uninterrupted. Importantly, Extreme's wireless solution does not require licenses to utilize the failover access point functionality so no additional licenses are required.

4.7.3 Does the proposed wireless controller perform load balancing. Explain in detail.

Yes. The proposed Extreme CloudController's support Auto AP Balancing and can operate in failover mode or load-sharing mode. Load balancing across clusters is performed at the WAP level. Extreme CloudControllers configured as Availability Pairs for high-availability can be configured for active-active, which evenly distributes WAP loads across both controllers. Support is also provided for Client Balancing to distribute client traffic evenly between WAPs in the same device group.

4.7.4 Does the proposed wireless controller perform auto failover? Explain in detail.

RESPONSE: Yes. Extreme CloudControllers in a high-availability configuration support automatic failover to a secondary controller. The secondary Extreme CloudController does not have to detect its link failure with the primary Extreme CloudController for the session availability to kick in. If the WAP loses five consecutive polls to the primary controller either due to the controller outage or connectivity failure, it fails over to the secondary controller fast enough to maintain the user session. Importantly, Extreme does not require licenses to utilize the failover WAP capacity; this is not the case with many competitive offerings.

4.7.5 Explain the reporting capabilities of the proposed wireless controllers.

BCDS currently has the Extreme CloudController, VE6215 deployed within their network.

The Extreme CloudController provides comprehensive dashboard reports delivering an intuitive and graphical representation of information related to devices, clients, and network traffic. The dashboards use widgets to display the information. A default dashboard is provided which can be customized, and IT can add additional dashboards with custom layouts and a unique set of widgets. The maximum number of supported dashboards is 10, and the free-form dashboard can have a maximum of 10 widgets. Depending on the

report, the widget represents historical data or a combination of historical and the latest data from shared memory.

With the Extreme CloudController Overview dashboard, you can easily monitor network activity and performance. The dashboard provides a graphical representation of information related to devices, clients, and network traffic that can help you proactively monitor and troubleshoot your network. The default Overview dashboard (shown below) displays a wealth of information on throughput and clients, and this information can be further filtered by radio band in each chart. You can also customize the default dashboard and add additional dashboards with custom layouts and a unique set of widgets to meet your exact needs. The Overview dashboard also offers a System Health widget that provides best practice information for your Extreme CloudController configuration.

The Extreme CloudController also provides dashboards for each managed site, as well as RF visualization dashboards that include floor plan views and heat maps.

4.8 NAC COMPATIBLITY OR SYSTEM

4.8.1 Describe in detail how your proposed system will be compatible with BCSD's NAC. If you are instead proposing a new NAC because compatibility is not possible, please skip this section and continue below in sections 4.8.2.

BCDS already currently has the ExtremeControl deployed within the district.
The proposed Extreme wired and wireless system is fully compatible with BCSD's current NAC system, ExtremeControl, providing you with investment protection. BCSD can leverage your existing ExtremeControl licenses and there is no need for retraining or to configure a new system. Furthermore, BCSD benefits from the more granular isolation policies (which prevent compromised endpoints from launching attacks while in the quarantine state) when using Extreme's policy-enabled devices.

4.8.2 Describe in detail the make, model, architecture, features, and capabilities of the proposed NAC system.

Not applicable. We recommend BCSD continue leveraging your current NAC system, ExtremeControl.

4.8.3 Describe how your NAC system will automatically distribute our devices to their proper subnets based on their enrollment profiles.

Not applicable. We recommend BCSD continue leveraging your current NAC system, ExtremeControl.

4.8.4 Describe how your NAC system is compatible with our MDM, JAMF.

Not applicable. We recommend BCSD continue leveraging your current NAC system, ExtremeControl.

4.9 WIRELESS SURVEY SOFTWARE

4.9.1 Paragraphs 3.7.3 and 3.13.1 document the district's understanding of industry best practices with regards to the physical placement of WAPs and the subsequent adjustments as indicated by the wireless surveys for optimization. Do you agree with this approach? Please acknowledge your agreement or clarify otherwise your proposed design approach.

Yes, agreement to best practices is acknowledged. Please note that in some cases where the environment is fully understood, the pre-install survey can possibly be lessened to save costs. The post-install survey to validate the performance is an excellent best-practice. PCS and Extreme look forward to sharing training with BCSD staff.

4.10 VALUE ENGINEERING

The Extreme solution offers differentiating capabilities that deliver additional flexibility benefits to BCSD. These include the proposed universal hardware platforms supporting multiple personalities and deployment modes which provides BCSD a unique benefit with the ability to purchase a single hardware platform that can be leveraged across multiple use cases. For example, the 5520 switches enable BCSD to run the current ExtremeXOS operating system at initial deployment or by simply reloading the switch you can move to a Campus Fabric solution enabled through the VOSS operating system. Likewise, by offering dual-boot WAP's, such as the AP4020 etc, we are enabling the option to move the same hardware to a cloud-based architecture with virtually no CAPEX spend. The flexibility of the proposed Extreme solution provides BCSD maximum choice in deployment mode and investment protection, with the reassurance that your hardware can support your immediate needs and evolve to support future needs that could occur and network architecture changes. BCSD is utilizing the fabric architecture in the core for additional security and also the flexibility of fabric attach and NAC on the edge already.

In addition to the Extreme Value Adds above, PCS is also offering the below as add on value to BCSD

- PCS will provide dedicated pre-sales team to have Best practice, Security, Future needs, road maps etc., discussions to keep the customer informed and moving towards a successful implementation.
- With our heavy focus on Education vertical, PCS is in a position to provide Collaboration opportunities for BCSD staff, with similar Schools in the southeast. This will give BCSD team mind share opportunities to experience firsthand what other school districts are experiencing and solving.
- PCS has local warehouses all over southeast where we can provide Lab environment for testing and implementing solutions including but not limited to the proposed solution.

- High and middle school hours are 8:45 am to 3:45 pm M-F
- Elementary school hours are 7:45 am to 2:45 pm M-F

In addition, school staff members will be active on the network before and after instructional hours. Any work done outside of the above instructional hours must be planned and approved by BCSD.

BCSD and vendor will coordinate after hours building access. **The majority of LVC work under this contract will be "after hours" work.**

4.11.3 During Normal Working Hours: For all work done within the scope of this RFP and for later projects whose scopes will be determined (Additional Services, T&M, maintenance calls, etc.) the labor rates per hour during normal working hours are:

Project Manager	$195
Engineer	$225
Technician	$170
IT Laborer	$150

NOTE: BCSD expects an engineering level resource to have networking and wireless related certifications issued from the manufacturer and to be skilled in configuring the switches, routers, WAPs, the wireless controllers, and the network/wireless management system. A Technician, by comparison, typically would not act as the project lead and would not be expected to have this level of qualifications. An IT Laborer would provide for basic installation requirements such as un-mounting and mounting WAPs. **These job titles and rates must match same on quotes and invoices.**

4.11.4 Travel, expenses, per diem, etc. are not to be billed separately but instead these costs should be built into your system and services costs.

4.12 GENERAL TERMS & CONDITIONS

4.12.1 List all conditions, objections, exceptions, and/or observations which you cannot or will not meet or accept in a separate document with regards to specific Section to which the offeror objects, takes exception(s), or provide(s) observation. Provide alternate language of solutions for BCSD's consideration.

4.13 PROPOSAL SUBMITTALS CHECK LIST

4.13.1 The following submittals must be included in the proposal. Indicate, in the space to the right, the section of the proposal in which each submittal has been included:

Comprehensive Proposal (six copies)	✓
Signed Cover Page One and Page Two	✓
Executive summary	✓

Bidder experience and capabilities	✓
Sub experience and capabilities	✓
Bidder manufacturer partner level	✓
Project team with resumes and certifications	✓
SPIN # required for E-Rate	✓
Proposed terms and conditions	✓
Sample invoice	✓
Technical information and cut sheets	✓
Certification and testing procedures	✓
Audited yearend financial statement – 3 years	✓
Objections, exceptions, observations (separate document)	✓
Copy of any required license(s)	✓
Response form	✓
Pricing sheet (Exhibit A)	✓
Acknowledge RFP paragraph 7.1.23 PURCHASING CARD	✓
Good faith bond or certified check	✓
Letter from surety company	✓
Minority and Woman Business Enterprise Policy	✓
Original signature in BLUE ink on all six proposal copies	✓

Offeror should submit all other information and documents requested in this part and in parts 2.1 - Special Instructions; 3.0 - Scope of Work; 5.0 - Qualifications; 8.0 - Bidding Schedule/Price Proposal; and any appropriate attachments addressed in section 9.0 - Attachments to Solicitations.

4.0.2 **Cost Proposal:**

The Offeror must submit the cost proposal, in the form of the Bid Form in a separate sealed envelope, clearly marked **Cost Proposal**.

5.0 QUALIFICATIONS:

5.0.1 QUALIFICATIONS OF OFFEROR:

To be eligible for award of a contract, a prospective Contractor must be responsible. In evaluating an Offeror's responsibility, the BCSD Standards of Responsibility and information from any other source may be considered. An Offeror must, upon request of the BCSD, furnish satisfactory evidence of its ability to meet all contractual requirements. Unreasonable failure to supply information promptly in connection with a responsibility inquiry may be grounds for determining that you are ineligible to receive an award.

5.1. QUALIFICATIONS – REQUIRED INFORMATION (MAR 2015):

Submit the following information or documentation for you and for any subcontractor (at any tier level) that you identify pursuant to the clause titled Subcontractor –



4.0.1.8 Exceptions/Observations

Extreme networks

Simplify with Technology

4.0.1.8 Exceptions /Observations Document

PCS Exception:

As a privately held company we are not required to have audited financials therefore we have provided our most recent tax return. The tax documents have been sent separately for this bid. PCS has extensive financial resources and has completed project of similar and much larger scope for school districts and large commercial organizations all over south East US. Please let us know if you would like to speak to either of our financial partners, Wells Fargo or Northern Trust Bank or any other financial documents, besides the tax documents submitted, that we can submit in leu of the audited financial to satisfy this bid.



Proposed Terms and Conditions

Extreme networks

pcs Simplify with Technology

Proposed Terms and Conditions

PCS agrees to all the terms and conditions set forth within the RFP.

Sample Invoice



Certification and Testing Procedures

Extreme networks

Simplify with Technology

PCS and Beaufort County School District will collaborate closely to perform a comprehensive on-site evaluation of the current network infrastructure at each location included in the project scope. This evaluation will include documentation review, site observations, and technical discussions with the District's networking staff to ensure full understanding of the existing environment.

Network Evaluation and Discovery

The evaluation phase will include:

- Network analysis and data collection to document the current topology, device inventory, and performance benchmarks.
- Physical infrastructure review, including sample site inspections to assess cabling, pathways, power availability, and potential environmental obstructions.
- Interviews with district IT staff to confirm operational requirements, priorities, and existing network challenges.

Based on the information gathered during discovery, PCS will develop a Test and Validation Plan in coordination with the District. This plan will outline the testing approach, success criteria, and performance validation methods.

Testing Plan Components

The jointly developed Test Plan will include, but is not limited to, the following areas:

- Connectivity testing for critical applications and essential network services.
- Routing verification across the network, including VLAN and Layer 3 performance validation.
- Network segmentation and isolation testing to confirm proper access control and traffic separation.
- Authentication and access control validation, ensuring compliance with district security policies.
- Wireless coverage verification based on facility floor plans and signal propagation analysis.

- Performance validation of all networking and security components included in the project scope.

Testing and Verification Process

Once new equipment is installed and mounted in the customer-supplied racks, PCS will power on and perform a full installation verification procedure for each device. This process will include:

- Visual confirmation of link lights, power status, and CPU operation.
- ICMP Echo (Ping) testing to verify device connectivity.
- Validation that devices are properly modeled within Extreme Management Center (XMC) or equivalent management platform.
- Verification that end-user devices obtain valid IP addresses via DHCP.
- Confirmation of Internet access through HTTP requests (e.g., accessing www.google.com or similar resources).

Documentation, Closure, and Acceptance

During the testing phase, PCS will document all findings and action items in a Project Closure Plan. PCS and the District will jointly review and categorize each item by priority, necessity, and recommended resolution.

Upon completion of all agreed-upon corrective actions and validation testing, PCS and the District will execute a Project Closure Agreement, signifying mutual confirmation that all deliverables and performance objectives have been met in accordance with the Scope of Work and Statement of Work.

The Implementation Stage concludes with successful execution of the Testing and Acceptance Plan as developed during the Planning and Design Phase. Upon final approval, the project transitions into the Operate Stage for ongoing support and maintenance.

Once all hardware, firmware, and configurations have been implemented, tested, and accepted by the District, PCS will prepare and deliver comprehensive as-built documentation, including network diagrams, configuration details, and test results.



3 Years of Audited Financial Statements

Extreme networks

pcs Simplify with Technology

3 Years of Audited Financial Statements

PCS has mailed Financial Information in a separately sealed, labeled envelope.

As a privately held company we are not required to have audited financials therefore we have provided our most recent tax return. The tax documents have been sent separately for this bid. PCS has extensive financial resources and has completed project of similar and much larger scope for School districts and large commercial organizations all over south East US. Please let us know if you would like to speak to either of our financial partners, Wells Fargo or Northern Trust Bank or any other financial documents, besides the tax documents submitted, that we can submit in leu of the audited financial to satisfy this bid.



Required Licenses

Retail Sales Tax

THIS LICENSE MUST BE PUBLICLY DISPLAYED AS PROVIDED BY LAW

STATE OF SOUTH CAROLINA
DEPARTMENT OF REVENUE
RETAIL LICENSE

THIS LICENSE IS NEITHER TRANSFERABLE NOR ASSIGNABLE BEFORE POSTING READ INSTRUCTIONS BELOW

ST-1
(Rev. 08/28/18)
5000

OWNER NAME AND BUSINESS LOCATION:

LICENSE MUST BE RETURNED FOR ALL CHANGES AND/OR CLOSE OF BUSINESS

PC SOLUTIONS & INTEGRATION, INC.
4937 SW 75TH AVE
MIAMI FL 33155-4440

LICENSE NUMBER
121071874

PC SOLUTIONS & INTEGRATION, INC.
4937 SW 75TH AVE
MIAMI FL 33155-4440

INDUSTRY TYPE ▶ 541519
EFFECT DATE ▶ 01-Jan-2020

Letter ID: L0013984295

TRADE NAME AND MAILING ADDRESS

THIS LICENSE IS VALID FOR ABOVE LOCATION ONLY. CHANGE OF LOCATION OR OWNERSHIP REQUIRES NEW LICENSE.

EACH PLACE OF BUSINESS MUST BE LICENSED SEPARATELY

File # 121071874 SID # 9086688

This retail license is issued pursuant to Article 5, Chapter 36, Title 12, Code of Laws of South Carolina, 1976, as amended. The retail license is valid so long as the person to whom it is issued continues in the same business at the same location as shown on license, unless revoked by the Department of Revenue for cause. It is presumed that a retailer is not continuing in the same business and must surrender the retail sales license if the retailer has no retail sales for twenty-four consecutive months. To allow the license to remain valid, the retailer may submit an affidavit to the department swearing that the business is continuing. If the business is closed, moved or sold, the licensee must complete the questions listed below and return this license to the SC Department of Revenue, PO Box 125, Columbia, SC 29214.

IF THERE ARE ANY QUESTIONS REGARDING THIS LICENSE, CONTACT THIS DIVISION AT 1-844-898-8542

OUT OF BUSINESS OR CHANGE OF OWNERSHIP **(Also complete C-278)**

DATE OF CLOSING OR SALE _____

NEW FIRM NAME _____

NEW OWNER'S NAME OR NAMES _____

CHANGE OF ADDRESS AND/OR TRADE NAME **(Also complete SC-8822)**

IF BUSINESS LOCATION CHANGES, RETURN THIS LICENSE AND COMPLETE CHANGE OF ADDRESS/BUSINESS LOCATION FORM SC-8822.
IF BUSINESS IS MOVED OR THE TRADE NAME IS CHANGED, GIVE THE:

NEW TRADE NAME _____ DATE BUSINESS MOVED _____

NEW LOCATION ADDRESS _____ BUSINESS MUNICIPAL LIMITS _____

MAILING ADDRESS _____ NEW TELEPHONE NUMBER _____

INSTRUCTIONS

This is your new license. Please fold on the above perf marks and display in a conspicuous place.

If you have any questions concerning this license, please call the SC Department of Revenue 1-844-898-8542.

If the business is closed, moved, or sold, please complete the form above and return it with the original license to:

South Carolina Department of Revenue
Registration Section
P.O. Box 125, Columbia, SC 29214-0400

JP:465E:00117S:010IN:0A#:A0009331781J:0000022333

IMPORTANT INFORMATION ABOUT YOUR LICENSE

PROVIDE A COPY OF THIS INFORMATION BELOW TO YOUR CPA AND/OR TAX PREPARER

ST-1 Retail License number: 121071874

A RETURN MUST BE FILED EVEN IF YOU HAVE ZERO SALES FOR THE MONTH

FILING FREQUENCY (PERIOD)	WHAT DO I REPORT?	WHEN IS THE RETURN DUE?	EXAMPLE
Monthly	Total sales for the month	20th of the following month	Sales for Jan 1st - 31st reported on January return Due by February 20th
Quarterly	Jan-Mar sales reported on March return Apr-Jun sales reported on June return July-Sept sales reported on September return Oct-Dec sales reported on December return	20th of the following month after the quarter	Sales for Jan 1st - Mar 31st reported on March return Due by April 20th
Annual	Jan-Dec sales reported on December return	20th of the following month after the year	Sales for Jan 1st - Dec 31st reported on December return Due by the following January 20th

You must submit a written request for approval to change your filing frequency.

Types of Sales Tax Returns

- **ST-3** Sales and Use tax return
- **ST-3T** Accommodation Report by County or Municipality - *filed with the ST-388*
- **ST-388** Accommodation tax return
- **ST-389** Schedule for local tax- *filed with ST-3; ST-388; ST-403; or,ST-455*
- **ST-403** Aviation Fuel tax return
- **ST-406** 911 User Fee return
- **ST-455** Max tax return

Visit our website at **www.dor.sc.gov** for applicable tax information, sales and use tax changes, updates, tutorials, and free workshops.

Other Applicable Forms

- **C-278** Account Closing Form
- **SC2848** Power of Attorney and Declaration of Representative
- **SC8822** Change of Address/Business Location

The South Carolina Department of Revenue requires that a valid Power of Attorney form SC2848 be filed before we have any discussion with or share any information with your CPA or Tax Preparer.

File returns and/or submit payments electronically for free at **MyDORWAY.dor.sc.gov**. Free and secure payment options include Electronic Funds Withdrawal (EFW or bank draft) and Credit Card (MasterCard or Visa).
Electronic Filing HelpLine – 1-844-898-8542

Extreme networks

FY26

DIAMOND ELITE Partner

PC Solutions and Integration



Acknowledgments

2.1 Special Instructions

PCS agrees and complies to all special instructions laid out within this section.

3.0 Scope of Work

PCS complies with all requirements within this section. PCS meets all required implementation strategies within this section as well as all of the network equipment specified.

Please see the Scope of Work below for implementation strategy and details.

5.0 QUALIFICATIONS

5.0.1 QUALIFICATIONS OF OFFEROR:

To be eligible for award of a contract, a prospective Contractor must be responsible. In evaluating an Offeror's responsibility, the BCSD Standards of Responsibility and information from any other source may be considered. An Offeror must, upon request of the BCSD, furnish satisfactory evidence of its ability to meet all contractual requirements. Unreasonable failure to supply information promptly in connection with a responsibility inquiry may be grounds for determining that you are ineligible to receive an award.

5.1. QUALIFICATIONS – REQUIRED INFORMATION (MAR 2015):

Submit the following information or documentation for you and for any subcontractor (at any tier level) that you identify pursuant to the clause titled Subcontractor – Identification. Err on the side of inclusion. You represent that the information provided is complete.

Proposers must meet or exceed these qualifications to be considered for award. Any exceptions to the requirements listed should be on a separate sheet marked "Exceptions" and clearly detailed in proposer's response.

a) The general history and experience of the business in providing work of similar size and scope. Five (5) year minimum.

PCS was incorporated in 1995. From our inception, we have focused on educational clients. PCS had active K-12 customers and large University clients over its inception. Based on our Education focus we have a large market share in education market for networking infrastructure throughout the Southeastern United States.

PCS started out of the owner's garage in 1995, 25 years later, PCS has become an IT powerhouse servicing thousands of clients in the SE United States. Since the beginning, PCS has focused on delivering tailor-made IT solutions to K-12 School Districts because they know the tremendous impact technology has on bettering education. This mission of improving our community's schools through technology has passionately driven PCS to work with numerous throughout the Southeast.

Please see our “Executive Summary” as well as “Offeror’s Experience” section for additional information.

b) Information reflecting the current financial position. Include the most current audited financial statement and audited financial statements for the last three (3) fiscal years.

Please see the Financial Stability Section; PCS has mailed our Financial Information in a separately sealed envelope.

As a privately held company we are not required to have audited financials therefore we have provided our most recent tax return. The tax documents have been sent separately for this bid. PCS has extensive financial resources and has completed project of similar and much larger scope for School districts and large commercial organizations all over south East US. Please let us know if you would like to speak to either of our financial partners, Wells Fargo or Northern Trust Bank or any other financial documents, besides the tax documents submitted, that we can submit in leu of the audited financial to satisfy this bid.

c) A detailed, narrative statement listing the three (3) most recent, comparable contracts (including contact information) which have been performed.

A list of similar projects for which Offeror has performed, at any time during the past three (3) years, services substantially similar to those sought with this solicitation. Err on the side of inclusion; by submitting an Offer, Offeror represents that the list is complete. School District experience is desired.

a) Must have a clear understanding of industry standards and best practices.

PCS maintains a strong and up-to-date understanding of industry standards and best practices across enterprise networking. Our engineering team follows established IEEE, TIA/EIA, NIST, and manufacturer-recommended guidelines to ensure all designs, configurations, and installations are secure, reliable, and aligned with proven networking practices.

b) Offeror shall provide with their proposal copies of all appropriate certifications, licenses and permits, as well as evidence to support the documentation.

Please see section “4.0.1.5” and “Required Licenses” for all certifications and licenses.

c) Must have knowledge of and comply with all currently applicable, and as they become enacted during the contract term, federal, state and local laws, statutes, ordinances, rules and regulations. All laws of the State of South Carolina, whether substantive or procedural, shall apply to the contract, and all statutory, charter, and ordinance provisions that are applicable to public contracts in the District shall be followed with respect to the contract.

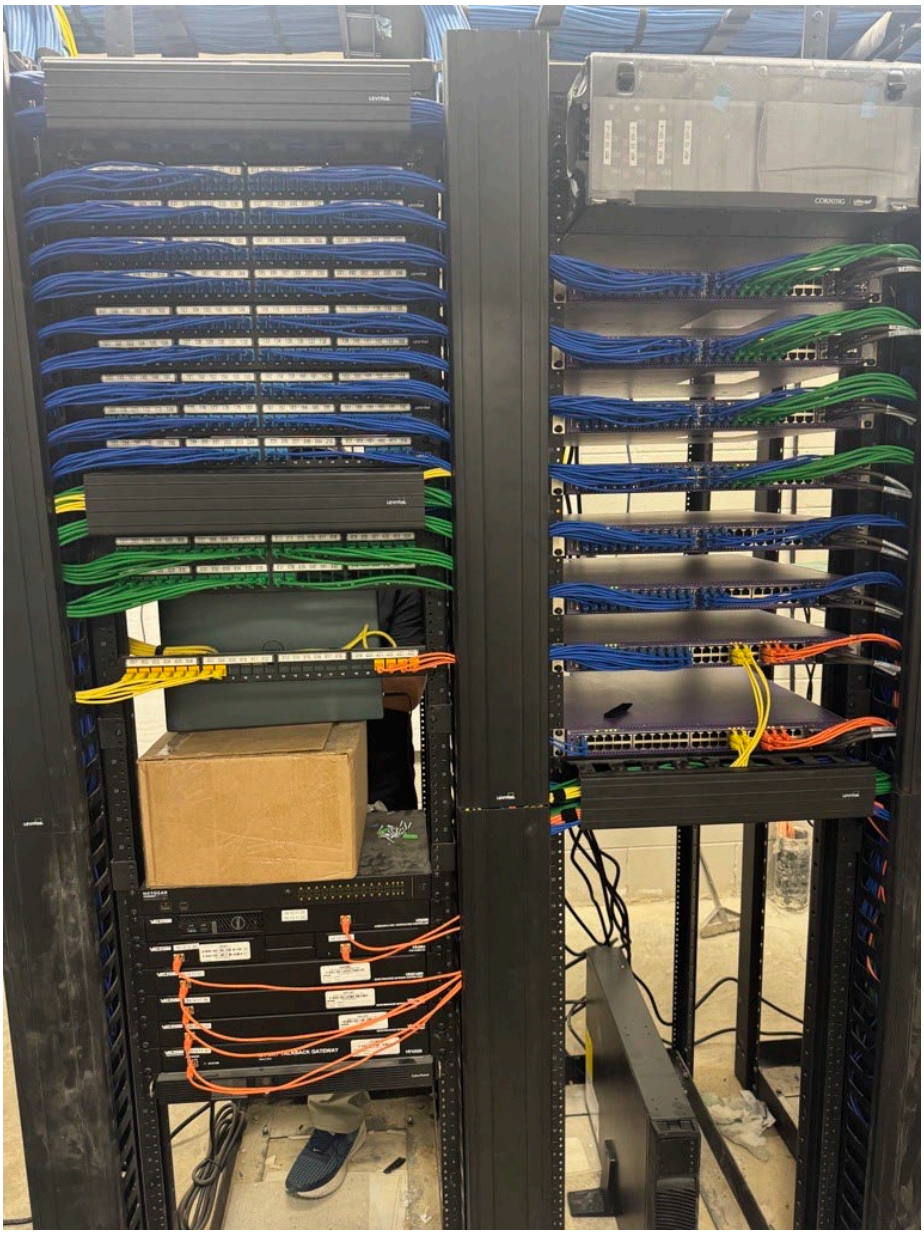
PCS understands and complies with all federal, state and local laws, statutes, ordinances, rules and regulations.

d) List of failed projects, suspensions, debarments, and significant litigation.

No litigation or regulatory action has ever been filed against PCS. PCS has never been suspended or failed a project with our customers.

e) List of at least five (5) references of similar projects for these services.

f) Pictures showing implementation of vendor's equipment/solution.





5.2 SUBCONTRACTOR INDEMNIFICATION:

If you intend to subcontract with another business for any portion of the work and that portion exceeds 10% of your price, your offer must identify that business and the portion of work that they are to perform. Identify potential Subcontractors by providing the business' name, address, phone, taxpayer identification number, and point of contact. In determining your responsibility, the BCSD may evaluate your proposed Subcontractors.

Should PCS determine during the planning or implementation phases that subcontracted services are required and would exceed this threshold, we will identify all proposed

subcontractors in full compliance with Section 5.2 of the RFP. PCS will provide the District with the subcontractor's name, address, phone number, taxpayer identification number, scope of work, and point of contact prior to engagement.

PCS maintains established relationships with several qualified minority- and woman-owned subcontractors who may be utilized for specialized services such as cabling or field installation, depending on project needs. However, no subcontractor has currently been selected for work exceeding the required reporting threshold.

PCS acknowledges and agrees that BCSD may evaluate any proposed subcontractors as part of determining contractor responsibility.

Acknowledgement of RFP Paragraph 7.1.23

Contractor agrees to accept payment by the South Carolina Purchasing Card for no extra charge. The Purchasing Card is issued by Visa. The purchasing card allows BCSD to make authorized purchases from a vendor without the requirement to issue a purchase order.

PCS acknowledges receipt, understanding, and full acceptance of the requirements outlined in Section 7.1.23 of this RFP. PCS agrees to comply with all stated conditions, obligations, and responsibilities as specified therein.

8.0 Bidding Schedule/Price Proposal

Please see the separate Cost Proposal for Exhibit A for complete information. Per the RFP requirements, Exhibit A – Cost Proposal, is provided in a separately sealed envelope and/or box.

9.0 Attachments to the Solicitations

Please see" MINORITY & WOMAN BUSINESS ENTERPRISE POLICY FORM" for part of this section.

Statement of Intent

We, the undersigned have prepared and submitted all the documents required for this project. We have prepared these documents with a full understanding of the Beaufort County School District's goal to ensure equal opportunities in the proposed work to be undertaken in performance of this project. Specifically, the BCSD seeks to encourage and promote on an inclusionary basis contracting opportunities without regard to the race, gender, national origin or ethnicity of the ownership or management of any business and that it is an equal opportunity employer and contracting entity. We certify that the representations contained in the Minority/Woman Business Enterprise (M/WBE) Utilization Report, which we have submitted with this solicitation, are true and correct as of this date. We commit to undertake this contract with the Minority/Woman Business Utilization Report we have submitted, and to comply with all non-discrimination provisions of the Minority/Woman Business Enterprise Program in the performance of this contract.

Signature

11/18/2025

Date

Name: Katie Simpson

Title: Senior Account Executive

Project: RFP #26-007, Network Electronics Systems and Services

Minority & woman Business Enterprise Policy Form

Extreme networks

pcs Simplify with Technology

Minority and Woman Business Enterprise Policy and Requirements

PCS fully supports the Minority and Woman Business Enterprise (MWBE) Policy and Requirements outlined in Section 9.0 of the RFP and is committed to fostering diversity, inclusion, and equitable business practices in every aspect of our work. We actively participate in organizations such as Women in Technology (WIT) and Women of the Channel, which help us champion the advancement and empowerment of minority and women-owned businesses throughout the technology industry.

PCS maintains an established network of minority- and woman-owned subcontractors, suppliers, and service partners whom we regularly engage across our K–12 and public sector projects. These firms support us in specialized areas such as cabling, installation services, technology integration, logistics, and field support. We remain committed to expanding and strengthening this network, and we actively seek new opportunities to partner with qualified MWBE firms throughout the Southeast.

PCS agrees to make good-faith efforts to achieve meaningful MWBE participation on this project by:

- Utilizing certified minority and woman-owned subcontractors
- Advertising subcontracting opportunities in appropriate publications and outreach channels
- Including MWBE firms in procurement activities whenever feasible
- Maintaining documentation and reporting in accordance with BCSD's MWBE requirements.

PCS is committed to supporting the District's goals of fostering inclusion, increasing economic opportunity, and maximizing MWBE participation in all future projects. Our long-standing relationships with diverse firms, combined with our continued outreach efforts, ensure that PCS contributes positively to the advancement of minority and woman-owned businesses within the region.

W/MBE Compliance Statement

PCS is committed to ensuring that all subcontracting and supplier opportunities on projects undertaken in South Carolina are open, accessible, and equitable for businesses regardless of race, gender, or ethnicity. PCS recognizes and fully supports the Beaufort County School District's Minority- and Woman-Owned Business Enterprise Policy and submits the following as our demonstration of compliance.

Eligible Bidder Category Selection

PCS qualifies under **Eligible Bidder Category 3: Commitment to future good faith outreach efforts in all projects undertaken in South Carolina.**

In addition to this commitment, PCS also maintains documentation of prior outreach and subcontractor engagement efforts that demonstrate our consistent and proactive approach to including minority- and woman-owned firms whenever feasible.

Good Faith Outreach Commitment

PCS will make **good-faith efforts on all current and future South Carolina projects** by:

1. Contacting the District's Purchasing and Contract Compliance Offices, as well as relevant state, local, and private MWBE organizations and directories, to identify available minority- and woman-owned businesses.
2. Placing notices of subcontracting opportunities in **relevant newspapers, trade journals, online platforms, and MWBE-focused publications** to specifically reach certified MWBE firms.
3. Sending **direct invitations to bid** to qualified minority- and woman-owned subcontractors and suppliers within our established partner network and beyond.
4. Providing **clear evaluation criteria** and full contact information in all notices, invitations, and solicitations for subcontracting opportunities.
5. Responding promptly to all inquiries, providing access to project documents, and ensuring sufficient time for all interested firms—including MWBEs—to prepare competitive bids.
6. Considering and hiring qualified and available MWBE firms for subcontracting opportunities whenever they meet the project's scope, experience, and performance requirements.
7. Maintaining **complete written documentation** of all outreach efforts, bids, quotes, proposals, and communications with subcontractors in accordance with BCSD's reporting requirements.

Established MWBE Relationships

PCS is currently certified as a W/MBE and we regularly utilize **minority- and woman-owned subcontractors** for work throughout the Southeast. Our network includes firms specializing in:

- Low-voltage cabling and infrastructure
- Installation and field services
- Technology integration
- Logistics and support

This network provides an immediate opportunity for MWBE involvement on eligible BCSD projects, and PCS will continue to grow and diversify this list through ongoing outreach and partnership cultivation.

Compliance for Projects Exceeding Five Million Dollars

For projects equal to or exceeding five million dollars in value, PCS acknowledges the District's requirement to make a good-faith effort to enter into a **joint venture or Mentor/Protégé** arrangement with at least one certified minority- and/or woman-owned firm. PCS is fully prepared to meet this requirement by:

- Identifying qualified MWBE joint venture candidates through state directories, MWBE organizations, and our existing partner network.
- Evaluating candidates that represent **different race or gender ownership**, as specified.
- Providing documentation that outlines outreach, evaluation, and attempted collaboration with MWBE partners.

Commitment Moving Forward

PCS is committed to full transparency and compliance with all MWBE requirements, including documentation, reporting, and subcontractor plan submissions. We believe strongly in promoting diversity, expanding economic opportunity, and supporting the continued growth of minority- and woman-owned businesses within South Carolina.

MWBE Participation Plan

PCS is committed to supporting Beaufort County School District's goals for Minority and Woman Business Enterprise (MWBE) participation. While PCS is not currently certified as an MWBE, we maintain long-standing partnerships with a network of qualified minority- and woman-owned subcontractors, suppliers, and service partners throughout the Southeast.

To promote meaningful MWBE involvement in this project, PCS will implement the following participation measures:

1. **Good-Faith Solicitation of MWBE Subcontractors**
   PCS will actively solicit bids, quotes, and participation from certified MWBE firms for any subcontracting, installation, cabling, or specialized service opportunities related to this project.

2. **Utilization of Pre-Qualified MWBE Partners**
   PCS will engage firms from our existing network of minority- and woman-owned subcontractors whenever their skills and capabilities align with project requirements.

3. **Public Outreach and Advertisement**
   PCS will advertise subcontracting opportunities in appropriate publications, directories, and MWBE outreach platforms to encourage additional participation from qualified firms.

4. **Fair and Equitable Bid Evaluation**
   MWBE subcontractor proposals will be evaluated fairly and equitably, with consideration for maximizing diverse participation while maintaining project quality and performance standards.

5. **Documentation and Reporting**
   PCS will maintain all required records and provide documentation of MWBE outreach and subcontractor participation in accordance with the District's reporting requirements.

6. **Ongoing Engagement and Growth**
   PCS will continue identifying, mentoring, and developing relationships with emerging MWBE firms to strengthen our diverse partner network for future opportunities.

Through these efforts, PCS is committed to contributing to the District's objective of expanding opportunities for minority- and woman-owned businesses and fostering a diverse and inclusive contracting environment.

Business Utilization Report

In order to facilitate an effective monitoring system, each contractor, bidder or offeror must submit a completed and signed Utilization Report with the bid submission which lists the names, addresses and contact persons of the M/WBE and majority owned businesses, if any, to be used in the contract, the type of work each business will perform, the dollar value of the work and the scope of work. The Utilization Report submitted by the contractor shall be submitted as a part of the contract with BCSD. If the information contained in the Contractor's Utilization Report changes by the time the contract is executed, the Contractor shall amend the Utilization Report and such amended Utilization Report shall be incorporated into the contract.

Business Enterprise Utilization Report

List all vendors/subcontractors to be used on this project. All MBEs or WBEs proposed for utilization on this project must be certified by the Small and Minority Business Assistance Office through the State of South Carolina according to the criteria of the Beaufort County School District's Minority Business Enterprise Plan prior to utilization on this project.

In column 2 below, please specify ethnic/racial/gender group as follows:

- AABE – African-American Business Enterprise
- HBE – Hispanic Business Enterprise
- ABE – Asian-American Business Enterprise
- WBE – Woman Business Enterprise

Sub-Contractor Name	Gender Group	Address	Phone #	Other	E-Mail

State of Florida

Woman & Minority Business Certification

pc solutions & integration, inc.

Is certified under the provisions of
287 and 295.187, Florida Statutes, for a period from:

04/29/2024 to 04/29/2026



Pedro Allende
Florida Department of Management Services

FLORIDA DEPARTMENT OF MANAGEMENT SERVICES
SUPPLIER DIVERSITY

Office of Supplier Diversity
4050 Esplanade Way, Suite 380
Tallahassee, FL 32399
850-487-0915
www.dms.myflorida.com/osd



Why PCS

Extreme networks

Simplify with Technology

PCS
Simplify with Technology

SIMPLIFY WITH TECHNOLOGY



A LEADING IT SOLUTIONS PROVIDER

www.pcsusa.net

TRANSFORMATIVE IT SOLUTIONS

At PCS, our mission is to bridge the gap between cutting-edge technology and the real world, empowering organizations to thrive in an ever-changing digital landscape. We are committed to delivering innovative, customized technology integration solutions that drive efficiency, enhance productivity, and foster seamless connectivity.

OUR SERVICES



WIRELESS NETWORK INFRASTRUCTURE

PCS provides network auditing, design optimization, and maintenance to predict and respond to your growing network needs.



CYBER SECURITY

The threat landscape is complex, but your security doesn't have to be.
PCS can help you protect your networks, implement industry standards, follow best practices, and reduce attack surfaces.



WIRED NETWORK INFRASTRUCTURE

Wired infrastructure is a crucial part of most organizations and has only grown in complexity. To manage that complexity, you need a team with a diverse skill set and a vendor-neutral approach.



DATA CENTER/ VIRTUALIZATION

The volume of data your business must manage has exploded. You need infrastructure that can capture, store, and archive massive amounts of data, while still keeping it readily accessible.



PRO SERVICES

IT should support your core business, not overtake it. Do you need to offload mundane service tasks? Do you need full support and strategic planning for the entire IT function? No matter where you fall on that spectrum, PCS can help.



UNIFIED COMMUNICATION

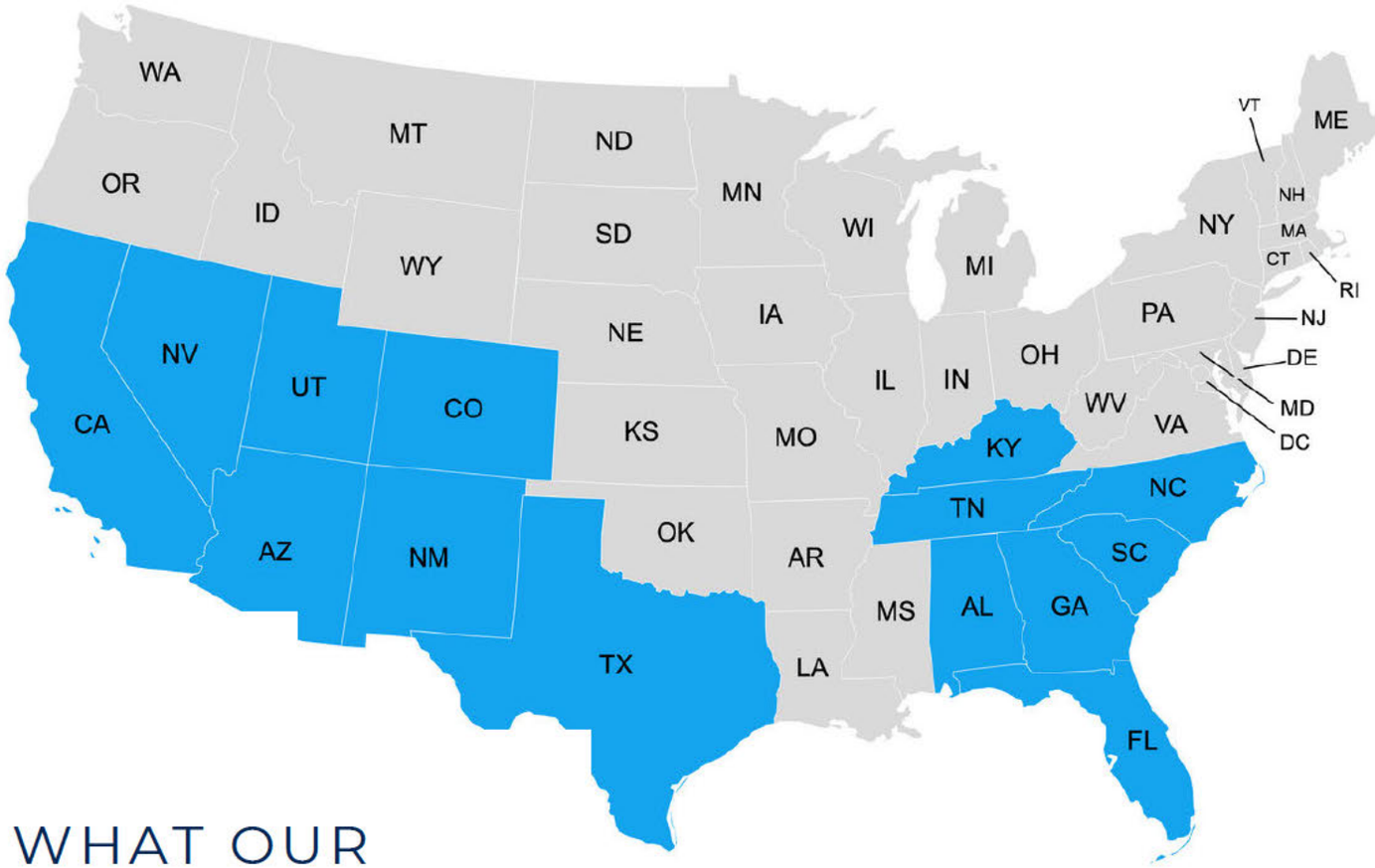
Unifying all of your businesses communication tools amplifies their power to transform your business through greater efficiency, better customer service, and stronger connections.

TECHNOLOGY PARTNERS

We are firm believers that when it comes to technology one size or partner does not fit all. That is why we work with more than 200 of the world's leading best of breed hardware, software, and application development companies so that we can bring you the right solution for your unique situation.



OUR LOCATIONS



WHAT OUR CUSTOMERS ARE SAYING

PCS has provided St. Petersburg College with excellent service and flexibility. They understand the education market and the challenges we face to continuously improve our technology infrastructure and services.

David Creamer

CTO & CISO, ST. PETERSBURG COLLEGE

The level of technical engineering brought to the Columbia County School District has both saved the district money while significantly improving the IT infrastructure for our students.

CTO, COLUMBIA COUNTY SCHOOLS

James Van Meter

Simplify with Technology

LET'S CONNECT

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sales@pcsusa.net

www.pcsusa.net

TRANSFORMATIVE IT SOLUTIONS

PCS
Simplify with Technology

At PCS, our mission is to bridge the gap between cutting-edge technology and the real world, empowering organizations to thrive in an ever-changing digital landscape. We are committed to delivering innovative, customized technology integration solutions that drive efficiency, enhance productivity, and foster seamless connectivity.

Who We Are

PCS was established in 1995 as a Certified Minority/Women-Owned Business. We believe in the transformative power of technology, and we strive to empower our clients to harness this power to its fullest potential. Our vision is to be the foremost choice for technology integration, known for our unwavering commitment to excellence and our ability to shape a brighter, more connected future for businesses and individuals.

Why Choose Us

Deep Industry Experience

We pride ourselves on being at the forefront of technological advancements, consistently enhancing our knowledge and skills to provide top-tier integration solutions.

Client-Centric Approach

We view our clients as partners, working collaboratively to understand their unique needs, goals, and challenges, and delivering tailored solutions that exceed their expectations.

Reliability

We commit to delivering dependable, robust, and future-proof technology integration services, ensuring uninterrupted business operations and sustainable growth.

Our Services

Wired/Wireless Network

- Assessment and Planning
- Design and Configuration
- Installation and Setup
- Seamless Connectivity
- Security Integration
- Performance Optimization
- Training and Support

Cyber Security

- Risk Assessment and Analysis Security Policies and Procedures Access Control
- Network Security
- Endpoint Security
- SEIM
- Cloud Security
- Data Loss Prevention
- Compliance and Regulatory Requirements
- Security Monitoring and Threat Intelligence
- Integration and Automation

Unified Communications

- Needs Assessment
- Integration Planning
- Vendor Selection
- Scalability
- Cost Management

www.pcsusa.net 1-800-391-0054 sales@pcsusa.net



Data Sheets

Extreme networks

Simplify with Technology

5420 Series
Universal Edge Switch Platform

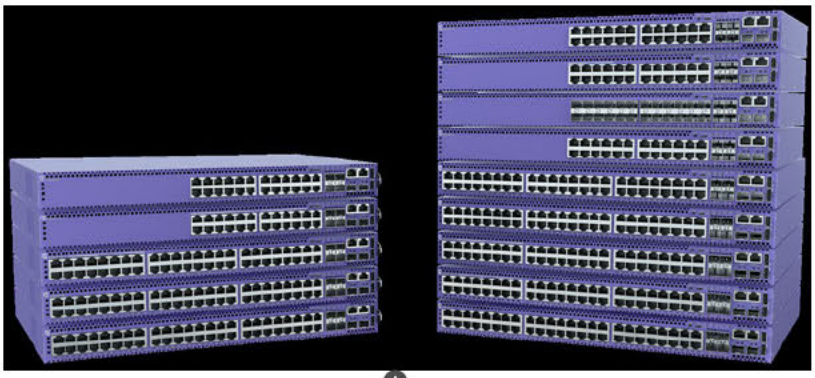
Highlights

- Fixed 24 and 48-port Gigabit and Multi-Gigabit Ethernet switches for enterprise edge deployments
- Universal dual-persona hardware allows user choice of switch operating systems
- ExtremeCloud IQ™ and ExtremeCloud IQ - Site Engine for powerful, secure and easy to use cloud-based network management.
- Fabric Connect for automated network operations, simplified network provisioning and enhanced security
- 1-year free ExtremeCloud IQ Pilot subscription included with each 5420 system

Key Hardware Features

- 4 x 1/10Gb SFP+ or 4 x 1/10/25Gb built-in uplink ports
- 30W, 60W and 90W PoE support (IEEE 802.3at/IEEE 802.3bt)
- Up to 8-unit 80Gb per unit stacking
- MACsec on 10/100/1000 access and uplink ports for secure link encryption*
- Non-blocking, wire-speed design

* Supported on specific hardware revisions; please refer to the ExtremeSwitching™ 5420 Hardware Installation Guide for details.



BUILT ON BROADCOM

The 5420 Series are high-performance, feature-rich edge switches designed for the next-generation digital enterprise. The 5420 Series universal hardware design provides end-to-end secure network segmentation, in addition to advanced policy capabilities, and offers a user-selectable choice of Extreme's flagship switch operating systems. This makes the 5420 a uniquely flexible platform that can be deployed across a range of edge and wiring-closet environments.

The 5420 Series consists of 14 models split across 5420M and 5420F families to address a variety of end-user needs and price points. 5420M models offer field-replaceable power supplies and fans, and 4 x 1/10/25Gb built-in uplink ports. 5420F models come with fixed power supply, fixed fan(s), 4 x 1/10Gb built-in uplink ports, with support for a second optional field-replaceable power supply.

Both 5420M and 5420F families include 24 and 48-port 1 Gigabit models, as well as 1/2.5 Gigabit multi-rate models. Both also provide 30/60/90W PoE capabilities making them an ideal wired backend for wireless APs or in support of next gen power Ethernet devices, such as digital signage, pan-tilt-zoom cameras, smart lighting, or point-of-sale terminals.

Management

The 5420 can be managed by ExtremeCloud™ IQ or ExtremeCloud IQ – Site Engine for comprehensive unified management with a consolidated view of users, devices and applications across wired and wireless networks. (NOTE: Each 5420 unit also includes a 1-year ExtremeCloudIQ Pilot subscription.)

Zero-touch provisioning from ExtremeCloud IQ lets one quickly bring new 5420 switches online as well as enable the selection of the operating system (OS) persona. Alternatively, 5420 on-box management can be done manually via a web-based GUI or generic CLI.

Universal Hardware Platform

The 5420 Series as a universal hardware platform comes with a dual-persona capability allowing user choice of the switch operating system (OS). Either the Switch Engine[1] or Fabric Engine[2] persona can be enabled on 5420 hardware models. The desired persona can be selected at start-up or changed at a later stage. Once selected, the 5420 assumes the features/capabilities of the selected OS.

5420 persona activation can be done manually at boot-up, including via the system CLI. Or, it can be automated by pre-provisioning the 5420 persona in ExtremeCloud IQ. When first booted, the 5420 automatically connects to ExtremeCloud IQ to find its persona. The pre-provisioned OS persona is then remotely enabled on the 5420 system – eliminating the need for manual selection.

Ethernet Fabric Services

The 5420 supports a variety of Ethernet Fabric services, including Extreme's Fabric Connect when running Fabric Engine and Extreme's IP Fabric when running Switch Engine. It also supports Fabric Attach for automated connection to either Layer 2 or Layer 3 fabric services. Extreme's Fabric Connect and IP Fabric on the 5420 enable the creation of virtualized networks that automate network operations, simplify network provisioning and enhance security, all while reducing the strain on network and IT personnel.

Audio Video Bridging

The 5420 series supports IEEE 802.1 Audio Video Bridging when running Switch Engine for reliable, real-time audio/video transmission over Ethernet. AVB technology delivers the quality of service required for today's high-definition and time-sensitive multimedia streams.

MACsec Link Encryption

IEEE 802.1AE MACsec* is supported on the 5420 access ports, as well as on its built-in uplink ports. MACsec is a hop-by-hop security capability which encrypts/decrypts packets between connected switches or devices. As a link-only encryption, the switches can still apply services to the packet, such as policy or QoS, without compromising the security of packets across the link. With 128-bit and 256-bit Advanced Encryption Standard (AES) support, the 5420 provides the most secure link encryption.

* Supported on specific hardware revisions; please refer to the ExtremeSwitching 5420 Hardware Installation Guide for details.

High-Performance Stacking

The 5420 series also supports high-speed stacking when running Switch Engine via its two built-in SFP-DD stacking ports. Up to eight systems can be stacked using qualified SFP+/SFP-DD direct attach cables and optical transceivers.

Power over Ethernet (PoE)

The 5420 Series includes Power over Ethernet models supporting standards-based IEEE 802.3bt (30/60/90W) PoE capabilities. This enables the 5420 to address the needs of powered edge devices, while eliminating the need for additional electrical cabling and circuits. In addition, 5420 PoE models also support perpetual and fast PoE for even more efficient and reliable powered edge device operation.

[1] Switch Engine is the new name for ExtremeXOS (EXOS) on all universal switch platforms, starting with Version 31.6

[2] Fabric Engine is the new name for the VSP Operating System Software (VOSS) on all universal switch platforms, starting with Version 8.6

External Interfaces

Switch Model	Interfaces
5420F-24T-4XE	24 x 10/100/1000Base-T ports • Full/Half-Duplex (autosensing) • MACsec-capable 4 x 1/10Gb SFP+ uplink ports (unpopulated) • MACsec-capable 2 x Stacking/SFP-DD ports* (unpopulated) 1 x Serial console port (RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 2 x USB A ports for management or external USB flash 1 x USB Micro-B console port
5420F-24P-4XE	24 x 10/100/1000Base-T 802.3at (30W) ports • Full/Half-Duplex (autosensing) • MACsec-capable 4 x 1/10Gb SFP+ uplink ports (unpopulated) • MACsec-capable 2 x Stacking/SFP-DD ports* (unpopulated) 1 x Serial console port (RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 2 x USB A ports for management or external USB flash 1 x USB Micro-B console port
5420F-24S-4XE	24 x 100/1000Base-X (SFP) ports (unpopulated) • MACsec-capable 4 x 1/10Gb SFP+ uplink ports (unpopulated) • MACsec-capable 2 x Stacking/SFP-DD ports* (unpopulated) 1 x Serial console port (RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 2 x USB A ports for management or external USB flash 1 x USB Micro-B console port
5420F-48T-4XE	48 x 10/100/1000Base-T ports • Full/Half-Duplex (autosensing) • MACsec-capable 4 x 1/10Gb SFP+ uplink ports (unpopulated) • MACsec-capable 2 x Stacking/SFP-DD ports* (unpopulated) 1 x Serial console port (RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 2 x USB A ports for management or external USB flash 1 x USB Micro-B console port
5420F-48P-4XE	48 x 10/100/1000Base-T 802.3at (30W) ports • Full/Half-Duplex (autosensing) • MACsec-capable 4 x 1/10Gb SFP+ uplink ports (unpopulated) • MACsec-capable 2 x Stacking/SFP-DD ports* (unpopulated) 1 x Serial console port (RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 2 x USB A ports for management or external USB flash 1 x USB Micro-B console port

External Interfaces (cont.)

Switch Model	Interfaces
5420F-48P-4XL	48 x 10/100/1000Base-T 802.3at (30W) ports • Full/Half-Duplex (autosensing) • MACsec-capable 4 x 1/10Gb SFP+ uplink ports (unpopulated) • MACsec-capable • LRM-capable 2 x Stacking/SFP-DD ports* (unpopulated) 1 x Serial console port (RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 2 x USB A ports for management or external USB flash 1 x USB Micro-B console port
5420F-8W-16P-4XE	8 x 10/100/1000Base-T 802.3bt (90W) ports • Full/Half-Duplex (autosensing) • MACsec-capable 16 x 10/100/1000Base-T 802.3at (30W) ports • Full/Half-Duplex (autosensing) • MACsec-capable 4 x 1/10Gb SFP+ uplink ports (unpopulated) • MACsec-capable 2 x Stacking/SFP-DD ports* (unpopulated) 1 x Serial console port (RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 2 x USB A ports for management or external USB flash 1 x USB Micro-B console port
5420F-16W-32P-4XE	16 x 10/100/1000Base-T 802.3bt (90W) ports • Full/Half-Duplex (autosensing) • MACsec-capable 32 x 10/100/1000Base-T 802.3at (30W) ports • Full/Half-Duplex (autosensing) • MACsec-capable 4 x 1/10Gb SFP+ uplink ports (unpopulated) • MACsec-capable 2 x Stacking/SFP-DD ports* (unpopulated) 1 x Serial console port (RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 2 x USB A ports for management or external USB flash 1 x USB Micro-B console port
5420F-16MW-32P-4XE	16 x 100M/1G/2.5GBase-T 802.3bt (90W) ports • MACsec-capable 32 x 10/100/1000Base-T 802.3at (30W) ports • Full/Half-Duplex (autosensing) • MACsec-capable 4 x 1/10Gb SFP+ uplink ports (unpopulated) • MACsec-capable 2 x Stacking/SFP-DD ports* (unpopulated) 1 x Serial console port (RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 2 x USB A ports for management or external USB flash 1 x USB Micro-B console port
5420M-24T-4YE	24 x 10/100/1000Base-T ports • Full/Half-Duplex (autosensing) • MACsec-capable 4 x 1/10/25Gb SFP28 uplink ports (unpopulated) • MACsec-capable 2 x Stacking/SFP-DD ports* (unpopulated) 1 x Serial console port (RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 2 x USB A ports for management or external USB flash 1 x USB Micro-B console port

External Interfaces (cont.)

Switch Model	Interfaces
5420M-24W-4YE	24 x 10/100/1000Base-T 802.3bt (90W) ports • Full/Half-Duplex (autosensing) • MACsec-capable 4 x 1/10/25Gb SFP28 uplink ports (unpopulated) • MACsec-capable 2 x Stacking/SFP-DD ports* (unpopulated) 1 x Serial console port (RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 2 x USB A ports for management or external USB flash 1 x USB Micro-B console port
5420M-48T-4YE	48 x 10/100/1000Base-T ports • Full/Half-Duplex (autosensing) • MACsec-capable 4 x 1/10/25Gb SFP28 uplink ports (unpopulated) • MACsec-capable 2 x Stacking/SFP-DD ports* (unpopulated) 1 x Serial console port (RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 2 x USB A ports for management or external USB flash 1 x USB Micro-B console port
5420M-48W-4YE	48 x 10/100/1000Base-T 802.3bt (90W) ports • Full/Half-Duplex (autosensing) • MACsec-capable 4 x 1/10/25Gb SFP28 uplink ports (unpopulated) • MACsec-capable 2 x Stacking/SFP-DD ports* (unpopulated) 1 x Serial console port (RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 2 x USB A ports for management or external USB flash 1 x USB Micro-B console port
5420M-16MW-32P-4YE	16 x 100M/1G/2.5GBase-T 802.3bt (90W) ports • MACsec-capable 32 x 10/100/1000Base-T 802.3at (30W) ports • Full/Half-Duplex (autosensing) • MACsec-capable 4 x 1/10/25Gb SFP28 uplink ports (unpopulated) • MACsec-capable 2 x Stacking/SFP-DD ports* (unpopulated) 1 x Serial console port (RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 2 x USB A ports for management or external USB flash 1 x USB Micro-B console port

* Notes on use of the 2 x Stacking/SFP-DD ports

1. With Switch Engine, the 2 x SFP-DD ports can used either for stacking or as Ethernet uplink ports (when not stacking).
2. With Fabric Engine, the 2 x SFP-DD ports can be used as Ethernet uplinks when in non-Fabric mode.
3. SFP-DD ports support either 10Gb or 20Gb data rates with the use of appropriate transceivers/cables.
4. When used as uplinks, 5420M models support up to 2 x 10Gb channels on each SFP-DD port
5. When used as uplinks, 5420F models support a single 10Gb channel on each SFP-DD port.

5420F Performance and Scale

Switch Model	Max Active 10/100/ 1000Mb Ports	Max Active 100Mb/1Gb/ 2.5Gb Ports	Max Active 100Mb/1Gb SFP ports	Max Active 1/10Gb SFP+ Ports	Max Active 1/10/25Gb SFP28 Ports	Max Active 20Gb Stacking Ports***	Aggregated Switch Bandwidth	Frame Forwarding Rate
5420F-24T-4XE	24	0	0	6*	0	2	208 Gbps	154.8 mpps
5420F-24P-4XE	24	0	0	6*	0	2	208 Gbps	154.8 mpps
5420F-24S-4XE	0	0	24	6*	0	2	208 Gbps	154.8 mpps
5420F-48T-4XE	48	0	0	6*	0	2	256 Gbps	190.5 mpps
5420F-48P-4XE	48	0	0	6*	0	2	256 Gbps	190.5 mpps
5420F-48P-4XL	48	0	0	6*	0	2	256 Gbps	190.5 mpps
5420F-8W-16P-4XE	24	0	0	6*	0	2	208 Gbps	154.8 mpps
5420F-16W-32P-4XE	48	0	0	6*	0	2	256 Gbps	190.5 mpps
5420F-16MW-32P-4XE	32	16	0	6*	0	2	304 Gbps	226.2 mpps

5420M Performance and Scale

Switch Model	Max Active 10/100/ 1000Mb Ports	Max Active 100Mb/1Gb/ 2.5Gb Ports	Max Active 100Mb/1Gb SFP ports	Max Active 1/10Gb SFP+ Ports	Max Active 1/10/25Gb SFP28 Ports	Max Active 20Gb Stacking Ports***	Aggregated Switch Bandwidth	Frame Forwarding Rate
5420M-24T-4YE	24	0	0	8**	4	2	328 Gbps	244.0 mpps
5420M-24W-4YE	24	0	0	8**	4	2	328 Gbps	244.0 mpps
5420M-48T-4YE	48	0	0	8**	4	2	376 Gbps	279.7 mpps
5420M-48W-4YE	48	0	0	8**	4	2	376 Gbps	279.7 mpps
5420M-16MW-32P-4YE	32	16	0	8**	4	2	424 Gbps	315.5 mpps

* Includes 2 x 1 /10G ports available using the SFP-DD ports when these ports are not used for stacking with Switch Engine, or when in non-Fabric mode with Fabric Engine

** Includes 4 x 1 /10Gb ports available through channelization of the 2 x SFP-DD ports when these ports are not used for stacking with Switch Engine, or when in non-Fabric mode with Fabric Engine. It also includes the 4 x SFP28 uplink ports when run at 1/10Gb

*** Switch Engine only: 20Gb stacking requires SFP-DD transceivers/cables; 10Gb stacking supported using SFP+ transceivers/cables

5420 Software Scaling Values

5420F Series with Switch Engine

- MAC Table: 32,000
- IPv4 ARP Table: 16,000
- IPv4 Route Table: 12,000
- IP Multicast Entries (S,G,V): 6,000
- IPv6 Route Table: 6,000
- IPv6 Neighbor Table 6,000
- ACL (Ingress/Egress): 8,000/1,024
- QoS Egress Queues/Port: 8
- VLANs: 4,094
- IP Interfaces (aka Routed VLANs): 1,533

One Policy Scaling

- Policy Profiles: 63
- Unique Permit/deny rules per switch: 4,024

5420M Series with Switch Engine

- MAC Table: 64,000
- IPv4 ARP Table: 24,000
- IPv4 Route Table: 12,000
- IP Multicast Entries (S,G,V): 12,000
- IPv6 Route Table: 6,000
- IPv6 Neighbor Table 12,000
- ACL (Ingress/Egress): 18,000/1,024
- QoS Egress Queues/Port: 8
- VLANs: 4,094
- IP Interfaces (aka Routed VLANs): 1,533

One Policy Scaling

- Policy Profiles: 63
- Unique Permit/deny rules per switch: 8,120

5420F Series with Fabric Engine

- MAC Table: 16,000 (32,000 non-Fabric)
- IPv4 ARP Table: 8,000
- IPv4 Route Table: 11,750
- IP Multicast Entries (S,G,V): 4,000
- IPv6 Route Table: 5,750
- IPv6 Neighbor Table 8,000
- ACL (Ingress/Egress): 1,024/336
- QoS Egress Queues/Port: 8
- VLANs: 4,059
- IP Interfaces (aka Routed VLANs): 248

Fabric Connect Scaling

- Fabric Adjacencies per switch: 50
- Fabric nodes per area (BEB + BCB): 500
- BEB Nodes per VSN (I-SID): 500
- L2 VSNs: 512
- L3 VSNs: 64

5420M Series with Fabric Engine

- MAC Table: 32,000 (64,000 non-Fabric)
- IPv4 ARP Table: 24,000
- IPv4 Route Table: 11,750
- IP Multicast Entries (S,G,V): 4,000
- IPv6 Route Table: 5,750
- IPv6 Neighbor Table 16,000
- ACL (Ingress/Egress): 1,024/336
- QoS Egress Queues/Port: 8
- VLANs: 4,059
- IP Interfaces (aka Routed VLANs): 248

Fabric Connect Scaling

- Fabric Adjacencies per switch: 50
- Fabric nodes per area (BEB + BCB): 500
- BEB Nodes per VSN (I-SID): 500
- L2 VSNs: 512
- L3 VSNs: 64

Weights and Dimensions

Switch Model	Weight*	Physical Dimensions
5420 Systems		
5420F-24T-4XE	9.03 lb/4.10 kg	17.4 in W/1.7 in H/11.3 in D 441 mm x 44 mm x 287 mm
5420F-24P-4XE	10.23 lb/4.64 kg	
5420F-24S-4XE	9.08 lb/4.12 kg	
5420F-8W-16P-4XE	10.23 lb/4.64 kg	
5420F-48T-4XE	10.23 lb/4.64 kg	
5420F-48P-4XE	11.64 lb/5.28 kg	17.4 in W/1.7 in H/13.0 in D 441 mm x 44 mm x 330 mm
5420F-48P-4XL	11.64 lb/5.28 kg	
5420F-16W-32P-4XE	11.82 lb/5.36 kg	
5420F-16MW-32P-4XE	11.68 lb/5.30 kg	
5420M-24T-4YE	9.22 lb/4.18 kg	
5420M-24W-4YE	9.70 lb/4.40 kg	
5420M-48T-4YE	9.68 lb/4.39 kg	
5420M-48W-4YE	10.43 lb/4.73 kg	
5420M-16MW-32P-4YE	11.68 lb/5.30 kg	

* Measured weight includes fan (XN-FAN-000) and PSU cover(s), but does not include optional power supply unit(s).

Optional Power Supply Unit Specifications

	XN-ACPWR-150W	XN-ACPWR-600W	XN-ACPWR-920W	XN-ACPWR-1200W*	XN-ACPWR-2000W**
Voltage Input Range (Nominal)	100-127/200-240 VAC	100-127/200-240 VAC	100-127/200-240 VAC	100-127/200-240 VAC	100-127/200-240 VAC
Line Frequency Range	47 to 63 Hz	47 to 63 Hz	47 to 63 Hz	47 to 63 Hz	47 to 63 Hz
Power Supply Input Socket	IEC/EN 60320 C14	IEC/EN 60320 C14	IEC/EN 60320 C14	IEC/EN 60320 C16	IEC/EN 60320 C16
Power Cord Input Plug	IEC/EN 60320 C13	IEC/EN 60320 C13	IEC/EN 60320 C13	IEC/EN 60320 C15	IEC/EN 60320 C15
Operating Temperature	0° C to 50° C Normal Operation	0° C to 50° C Normal Operation	0° C to 50° C Normal Operation	0° C to 50° Normal Operation	0° C to 45° C***

* 200-240 VAC is required to achieve full 1200W output. If run at 100-120 VAC, output is limited to 860W

** 200-240 VAC is required to achieve full 2000W output. If run at 100-120 VAC, output is limited to 1100W

*** At sea-level, 0° C to 40° C at 1500m; 0° C to 35° C at 3000m

5420F Internal Fixed and Secondary Power Supply Options

Model	Internal Fixed Power Supply Unit (PSU)*	Secondary Power Supply Unit (PSU)**
5420F-24T-4XE	120W AC PSU	XN-ACPWR-150W
5420F-24P-4XE	660W AC PSU	XN-ACPWR-600W
5420F-24S-4XE	150W AC PSU	XN-ACPWR-150W
5420F-48T-4XE	120W AC PSU	XN-ACPWR-150W
5420F-48P-4XE	860W AC PSU	XN-ACPWR-920W
5420F-48P-4XL	860W AC PSU	XN-ACPWR-920W
5420F-8W-16P-4XE	660W AC PSU	XN-ACPWR-600W
5420F-16W-32P-4XE	1200W AC PSU	XN-ACPWR-1200W
5420F-16MW-32P-4XE	1200W AC PSU	XN-ACPWR-1200W

* Internal Fixed PSU is non-orderable and comes pre-installed with each 5420F model.

** Secondary PSU provides power redundancy in 5420F non-PoE models and enables maximum PoE Power Budget in 5420F PoE models (see table below). Model/PSU combinations other than those listed above are blocked physically or in software.

5420F PoE Power Budget

Model	PoE Budget with Single Internal Fixed PSU	PoE Budget with Recommended Secondary PSU
5420F-24P-4XE	380W	720W
5420F-48P-4XE	740W	1480W
5420F-48P-4XL	740W	1480W
5420F-8W-16P-4XE	480W	960W
5420F-16W-32P-4XE	872W*/960W**	1437W*/1874W**
5420F-16MW-32P-4XE	860W*/960W**	1425W*/1862W**

* @ 100-120 VAC

** @ 200-240 VAC

5420M Primary and Secondary Power Supply Options

Model	Primary Power Supply Unit (PSU)*	Secondary Power Supply Unit (PSU)*
5420M-24T-4YE	XN-ACPWR-150W	XN-ACPWR-150W
5420M-24W-4YE	XN-ACPWR-920W	XN-ACPWR-920W
5420M-48T-4YE	XN-ACPWR-150W	XN-ACPWR-150W
5420M-48W-4YE	XN-ACPWR-920W or XN-ACPWR-2000W	XN-ACPWR-920W or XN-ACPWR-2000W
5420M-16MW-32P-4YE	XN-ACPWR-920W or XN-ACPWR-2000W	XN-ACPWR-920W or XN-ACPWR-2000W

* Primary PSU is required; Secondary PSU provides power redundancy and enables maximum PoE Budget in 5420M PoE models (see table below). Model/PSU combinations other than those listed above are blocked physically or in software.

5420M PoE Power Budget

Model	1 x 920W	2 x 920W	1 x 2000W @ 100-120VAC	1 x 2000W @ 200-240VAC	1 x 920W & 1 x 2000W @ 100-120VAC	1 x 920W & 1 x 2000W @ 200-240VAC	2 x 2000W @ 100-120VAC	2 x 2000W @ 200-240VAC
5420M-24W-4YE	720W	1440W	—	—	—	—	—	—
5420M-48W-4YE	804W	1558W	884W	1440W	1212W	2076W	1704W	2880W
5420M-16MW-32P-4YE	787W	1541W	867W	1440W	1195W	2059W	1687W	2400W

Minimum/Maximum Power Consumption and Heat Dissipation

Switch Model	Minimum Power Consumption (Watts)	Minimum Heat Dissipation (BTU/hr)	Maximum Power Consumption (Watts)*	Maximum Heat Dissipation (BTU/hr)**
5420F Switches				
5420F-24T-4XE	24	81	62	211
5420F-24P-4XE	37	127	833	387
5420F-24S-4XE	35	119	114	388
5420F-48T-4XE	31	106	75	255
5420F-48P-4XE	48	164	1674	663
5420F-48P-4XL	49	168	1657	604
5420F-8W-16P-4XE	37	127	1092	452
5420F-16W-32P-4XE	46	156	2150	785
5420F-16MW-32P-4XE	50	172	2152	790
5420M Switches				
5420M-24T-4YE	28	95	57	194
5420M-24W-4YE	43	148	1601	551
5420M-48T-4YE	34	117	68	232
5420M-48W-4YE	72	245	3090	716
5420M-16MW-32P-4YE	69	234	2564	560

* Includes maximum PoE load (W) through the switch

** Does not include PoE load heat dissipated through external electronic load

Acoustic Noise

	Bystander Sound Pressure – dB(A)*		Declared Sound Power – Bels*	
Switch Model	1 PSU	2 PSUs	1 PSU	2 PSUs
5420F-24T-4XE	35.5	36.2	4.83	4.93
5420F-24P-4XE	39.6	39.9	5.16	5.24
5420F-24S-4XE	39.7	39.6	5.21	5.22
5420F-48T-4XE	35.3	34.9	4.78	4.77
5420F-48P-4XE	41.3	42.0	5.42	5.48
5420F-48P-4XL	44.0	42.6	5.67	5.57
5420F-8W-16P-4XE	42.3	43.2	5.52	5.63
5420F-16W-32P-4XE	44.3	54.1	5.72	6.62
5420F-16MW-32P-4XE	45.3	54.4	5.77	6.64
5420M-24T-4YE	33.5	33.0	4.59	4.65
5420M-24W-4YE	33.0	42.8	5.02	5.51
5420M-48T-4YE	33.4	33.0	4.56	4.59
5420M-48W-4YE**	52.7	59.8	6.42	6.97
5420M-16MW-32P-4YE**	51.7	50.5	6.30	6.25

* Noise measurements are based on operational tests conducted at 25°C in compliance with ISO 7779

** 5420M-48W-4YE and 5420M-16MW-32P-4YE results using 2000W PSUs (XN-ACPWR-2000W)

Environmental

Environmental Specifications

EN/ETSI 300 019-2-1 v2.1.2 - Class 1.2 Storage

EN/ETSI 300 019-2-2 v2.1.2 - Class 2.3 Transportation

EN/ETSI 300 019-2-3 v2.1.2 - Class 3.1e Operational

EN/ETSI 300 753 (1997-10) - Acoustic Noise

ASTM D3580 Random Vibration Unpackaged 1.5 G

Environmental Compliance

EU RoHS - 2011/65/EU

EU WEEE - 2012/19/EU

EU REACH – Regulation (EC) No 1907/2006 Reporting

China RoHS - SJ/T 11363-2006

Taiwan RoHS - CNS 15663(2013.7)

Environmental Operating Conditions

Temp: 0° C to 50° C (32° F to 122° F)

Humidity: 10% to 95% relative humidity, non-condensing

Altitude: 0 to 3,000 meters (9,850 feet)

Shock (half sine) 30m/s2 (3G), 11ms, 60 shocks

Random vibration: 3 to 500 Hz at 1.5 G rms

Packaging and Storage Specifications

Temp: -40° C to 70° C (-40° F to 158° F)

Humidity: 10% to 95% relative humidity, non-condensing

Packaged Shock (half sine): 180 m/s2 (18 G), 6 ms, 600 shocks

Packaged Vibration: 5 to 62 Hz at velocity 5 mm/s, 62 to 500 Hz at 0.2 G

Packaged Random Vibration: 5 to 20 Hz at 1.0 ASD w/–3 dB/oct. from 20 to 200 Hz

Packaged Drop Height: 14 drops minimum on sides and corners at 42 inches (<15 kg box)

Regulatory and Safety

North American ITE

UL 60950-1

UL/CuL 62368-1 Listed

CSA 22.2 No. 60950-1 2nd edition 2014 (Canada)

Complies with FCC 21CFR 1040.10 (U.S. Laser Safety)

CDRH Letter of Approval (US FDA Approval)

European ITE

EN 60950-1 2nd Edition

EN 62368-1

EN 60825-1Class 1 (Lasers Safety)

2014/35/ EU Low Voltage Directive

International ITE

CB Report & Certificate per IEC 60950-1

CB Report & Certificate IEC 62368-1

AS/NZS 60950-1 (Australia /New Zealand)

EMI/EMC Standards

North American EMC for ITE

FCC CFR 47 Part 15 Class A (USA)

ICES-003 Class A (Canada)

European EMC Standards

EN 55032 Class A

EN 55024

EN 61000-3-2,2014 (Harmonics)

EN 61000-3-3 2013 (Flicker)

EN 300 386 (EMC Telecommunications)

2014/30/EU EMC Directive

International EMC Certifications

CISPR 32, Class A (International Emissions)

AS/NZS CISPR32

CISPR 24 Class A (International Immunity)

IEC 61000-4-2 / EN 61000-4-2 Electrostatic Discharge, 8kV Contact, 15 kV Air, Criteria B

IEC 61000-4-3 /EN 61000-4-3 Radiated Immunity 10V/m, Criteria A

IEC 61000-4-4 / EN 61000-4-4 Transient Burst, 2 kV, Criteria B

IEC 61000-4-5 /EN 61000-4-5 Surge, 2 kV L-L, 2 kV L-G, Level 3, Criteria B

IEC 61000-4-6 Conducted Immunity, 0.15-80 MHz, 10V/rms, 80%AM (1kHz), Criteria A

IEC/EN 61000-4-11 Power Dips & Interruptions, >30%, 25 periods, Criteria C

Country Specific

VCCI Class A (Japan Emissions)

ACMA RCM (Australia Emissions)

CCC Mark (China)

KCC Mark, EMC Approval (Korea)

BSMI (Taiwan)

Anatel (Brazil)

NoM (Mexico)

EAC (Russia, Belarus, Kazkhastan)

NRCS (South Africa)

IEEE 802.3 Media Access Standards

IEEE 802.3ab 1000BASE-T

IEEE 802.3bz 2.5G/5GBASE-T

IEEE 802.3bt Type4 PoE

IEEE 802.3ae 10GBASE-X

IEEE 802.3aq 10GBASE-LRM

IEEE 802.3by 25GBASE-X

IEEE 802.3az Energy Efficient Ethernet

Ordering Notes

Customers ordering a 5420F Series switch receive the hardware switch along with Base software license, integrated power supply, fan modules and rack-mount kit. 5420M Series switch customers receive the same components, except for power supplies which are not included with the unit. **In addition, each 5420 switch comes with a free 1-year ExtremeCloud IQ Pilot subscription.**

At least one Power Supply Unit (PSU) is required for 5420M operation. Additional power supplies (either for 5420F or 5420M switches), transceiver/optics, power cords, as well as Premier and/or MACsec licenses must be ordered separately.

Base Software and Optional Premier License

The Base software included with each 5420 unit supports most available software features. Certain features, however, require a Premier License to operate:

For Switch Engine, a Premier License is required for:

- 5 or more OSPF interfaces
- PIM DM/PIM SSM
- Anycast RP (Rendezvous Point)
- MultiSource Discovery Protocol (MSDP)
- IS-IS/BGP4/MBGP*
- GRE Tunneling
- Ethernet VPN (EVPN)

For Fabric Engine, a Premier License is required for:

- 5 or more OSPF active interfaces
- 3 or more BGP Peers
- Layer 3 Virtual Service Networks (L3 VSNs)

* Up to 2 BGP interfaces included in Base software with the ExtremeXOS 31.4 Release

Ordering Information

Part Number	Product Name	Description
5420F-24T-4XE	5420F 24-port Switch	5420 Universal Switch with 24 x 10/100/1000BASE-T full/half duplex ports, includes 4 x 1/10Gb SFP+ uplink ports, 2 x Stacking/SFP-DD ports, 1 internal fixed PSU, one unpopulated PSU slot, fixed fan module, Base software license, includes 1-year XIQ Pilot subscription
5420F-24P-4XE	5420F 24-port 30W PoE Switch	5420 Universal Switch with 24 x 10/100/1000BASE-T full/half duplex 802.3at 30W PoE ports, includes 4 x 1/10Gb SFP+ uplink ports, 2 x Stacking/SFP-DD ports, 1 internal fixed PSU, one unpopulated PSU slot, fixed fan module, Base software license, includes 1-year XIQ Pilot subscription
5420F-24S-4XE	5420F 24-port SFP Switch	5420 Universal Switch with 24 x 100M/1Gb SFP ports, includes 4 x 1/10Gb SFP+ uplink ports, 2 x Stacking/SFP-DD ports, 1 internal fixed PSU, one unpopulated PSU slot, fixed fan module, Base software license, includes 1-year XIQ Pilot subscription
5420F-48T-4XE	5420F 48-port Switch	5420 Universal Switch with 48 x 10/100/1000BASE-T full/half duplex ports, includes 4 x 1/10Gb SFP+ uplink ports, 2 x Stacking/SFP-DD ports, 1 internal fixed PSU, one unpopulated PSU slot, fixed fan module, Base software license, includes 1-year XIQ Pilot subscription
5420F-48P-4XE	5420F 48-port 30W PoE Switch	5420 Universal Switch with 48 x 10/100/1000BASE-T full/half duplex 802.3at 30W PoE ports, includes 4 x 1/10Gb SFP+ uplink ports, 2 x Stacking/SFP-DD ports, 1 internal fixed PSU, one unpopulated PSU slot, fixed fan module, Base software license, includes 1-year XIQ Pilot subscription
5420F-48P-4XL	5420F 48-port 30W PoE Switch w/LRM	5420 Universal Switch with 48 x 10/100/1000BASE-T full/half duplex 802.3at 30W PoE ports, includes 4 x 1/10Gb SFP+ LRM and uplink ports, 2 x Stacking/SFP-DD ports, 1 internal fixed PSU, one unpopulated PSU slot, fixed fan module, Base software license, includes 1-year XIQ Pilot subscription
5420F-8W-16P-4XE	5420F 24-port Switch w/8 ports 90W and 16 ports 30W PoE	5420 Universal Switch with 8 x 10/100/1000BASE-T full/half duplex 802.3bt 90W PoE ports and 16 x 10/100/1000BASE-T full/half duplex 802.3at 30W PoE ports, includes 4 x 1/10Gb SFP+ uplink ports, 2 x Stacking/SFP-DD ports, 1 internal fixed PSU, one unpopulated PSU slot, fixed fan module, Base software license, includes 1-year XIQ Pilot subscription
5420F-16W-32P-4XE	5420F 48-port Switch w/16 ports 90W and 32 ports 30W PoE	5420 Universal Switch with 16 x 10/100/1000BASE-T full/half duplex 802.3bt 90W PoE ports and 32 x 10/100/1000BASE-T full/half duplex 802.3at 30W PoE ports, includes 4 x 1/10Gb SFP+ uplink ports, 2 x Stacking/SFP-DD ports, 1 internal fixed PSU, one unpopulated PSU slot, fixed fan module, Base software license, includes 1-year XIQ Pilot subscription
5420F-16MW-32P-4XE	5420F 48-port Switch with 16 ports 90W multi-rate and 32 ports 30W PoE	5420 Universal Switch with 16 x 100Mb/1Gb/2.5Gb 802.3bt 90W PoE ports plus 32 x 10/100/1000BASE-T full/half duplex 30W PoE ports, includes 4 x 1/10Gb SFP+ uplink ports, 2 x Stacking/SFP-DD ports, 1 internal fixed PSU, one unpopulated PSU slot, fixed fan module, Base software license, includes 1-year XIQ Pilot subscription
5420M-24T-4YE	5420M 24-port Switch	5420 Universal Switch with 24 x 10/100/1000BASE-T full/half duplex ports, includes 4 x 1/10/25Gb SFP28 uplink ports, 2 x Stacking/SFP-DD ports, two unpopulated PSU slots, modular fan module, Base software license, includes 1-year XIQ Pilot subscription
5420M-24W-4YE	5420M 24-port 90W PoE Switch	5420 Universal Switch with 24 x 10/100/1000BASE-T 802.3bt 90W PoE full/half duplex ports, includes 4 x 1/10/25Gb SFP28 uplink ports, 2 x Stacking/SFP-DD ports, two unpopulated PSU slots, modular fan module, Base software license, includes 1-year XIQ Pilot subscription
5420M-48T-4YE	5420M 48-port Switch	5420 Universal Switch with 48 x 10/100/1000BASE-T full/half duplex ports, includes 4 x 1/10/25Gb SFP28 uplink ports, 2 x Stacking/SFP-DD ports, two unpopulated PSU slots, modular fan module, Base software license, includes 1-year XIQ Pilot subscription
5420M-48W-4YE	5420M 48-port 90W PoE Switch	5420 Universal Switch with 48 x 10/100/1000BASE-T 802.3bt 90W PoE full/half duplex ports, includes 4 x 1/10/25Gb SFP28 uplink ports, 2 x Stacking/SFP-DD ports, two unpopulated PSU slots, modular fan module, Base software license, includes 1-year XIQ Pilot subscription
5420M-16MW-32P-4YE	5420M 48-port Switch with 16 ports 90W multi-rate and 32 ports PoE	5420 Universal Switch with 16 x 100Mb/1Gb/2.5Gb 802.3bt 90W PoE ports plus 32 x 10/100/1000BASE-T full/half duplex 30W PoE ports, includes 4 x 1/10/25Gb SFP28 uplink ports, 2 x Stacking/SFP-DD ports, two unpopulated PSU slots, modular fan module, Base software license, includes 1-year XIQ Pilot subscription
Accessories		
XN-ACPWR-150W	150W AC PSU FB	150W AC PSU supported on 5420 Series
XN-ACPWR-600W	600W AC PSU FB	600W AC PSU supported on 5420 Series
XN-ACPWR-920W	920W AC PSU FB	920W AC PSU supported on 5420 Series
XN-ACPWR-1200W	1200W AC PSU FB	1200W AC PSU supported on 5420 Series
XN-ACPWR-2000W	2000W AC PSU FB	2000W AC PSU supported on 5420 Series
XN-FAN-000	Spare Fan Module	Spare Fan Module for 5420 Series
Software Licenses		
5000-PRMR-LIC-P	Premier License for 5000 Series	Perpetual Premier License for 5000 Series switches
5000-MACSEC-LIC-P	MACsec License for 5000 Series	Perpetual MACsec license for 5000 Series switches

Warranty

All 5420 Series models are covered under Extreme's Universal LLW policy. For warranty details, please visit: http://www.extremenetworks.com/support/policies.

Power Cords

In support of Extreme Networks Green initiatives, power cords are not included with the 5420, but can be ordered separately. They should be specified at time of ordering.

Optics/Transceivers

For a list of the optics/transceivers supported on the 5420 Series hardware, refer to our Extreme Optics Compatibility Tool at https://optics.extremenetworks.com.

Maintenance Services

Extreme's maintenance and support services with 100% in-sourced engineering experts and over 90% first-person resolution ensure efficient operation of your business-essential network. 24x7x365 phone support, advanced parts replacement, and on-site support augment your staff with experienced resources that help you mitigate critical network issues fast. Visit Extreme Maintenance Services for more information.

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5520 Series

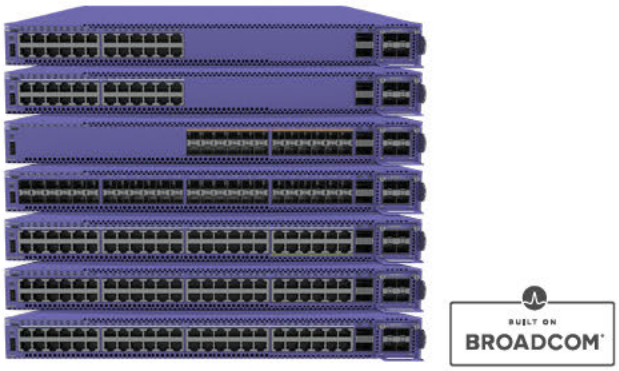
Universal Edge/Aggregation Switch Platform

Highlights

- Fixed 24 and 48-port switches for enterprise edge and aggregation deployments
- Universal dual-persona hardware allows user choice of switch operating systems
- ExtremeCloud IQ™ and ExtremeCloud IQ - Site Engine for powerful, secure and easy to use cloud-based network management.
- Fabric Connect for automated network operations, simplified network provisioning and enhanced security
- 1-year free ExtremeCloud IQ Pilot subscription included with each 5520 system
- Front to Back cooling on all models
- Back to Front cooling option on specific models

Key Hardware Features

- 10Gb and 25Gb modular uplink options
- 30W, 60W and 90W PoE support (IEEE 802.3at/IEEE 802.3bt)
- Up to 8-unit 200Gb stacking
- Hot-swappable, redundant power supplies and fans
- MACsec on access and modular uplink ports for secure link encryption
- Extended Edge Switching controlling bridge in support of V300/V400 edge devices
- Non-blocking, wire-speed design



The 5520 Series is a family of high-performance, feature-rich edge and aggregation switches designed for the next-generation digital enterprise. The 5520 Series universal hardware provides end-to-end secure network segmentation, in addition to advanced policy capabilities, and offers a user-selectable choice of Extreme's flagship switch operating systems. This makes the 5520 a uniquely flexible platform that can be deployed across a range of edge, aggregation and wiring-closet environments.

The 5520 Series includes 24- and 48-port 1 Gigabit models, 1/2.5/5 Gigabit multi-rate models, as well as a 24-port 10 Gigabit model. The family also offers 30/60/90W PoE making it an ideal wired backend for wireless APs or in support of next-gen powered Ethernet devices, such as digital signage, pan-tilt-zoom cameras, smart lighting or point-of-sale terminals. The 5520 further supports 10Gb and 25Gb modular uplinks for flexible linkage to other switches or devices over a range of media.

Management

The 5520 can be managed by ExtremeCloud IQ or ExtremeCloud IQ – Site Engine for comprehensive unified management with a consolidated view of users, devices and applications across wired and wireless networks. (NOTE: Each 5520 unit also includes a 1-year ExtremeCloud IQ Pilot subscription.)

Zero-touch provisioning from ExtremeCloud IQ lets one quickly bring new 5520 switches online as well as enable the selection of the operating system (OS) persona. Alternatively, 5520 on-box management can be done manually via a web-based GUI or generic CLI.

Universal Hardware Platform

The 5520 Series as a universal hardware platform comes with a dual-persona capability allowing user choice of the switch operating system (OS). Either the Switch Engine1 or Fabric Engine2 persona can be enabled on 5520 hardware models. The desired persona can be selected at start-up or changed at a later stage. Once selected, the 5520 assumes the features/ capabilities of the selected OS.

The 5520 persona activation can be done manually at boot-up, including via the system CLI. Or, it can be automated by pre- provisioning the 5520 persona in ExtremeCloud IQ. When first booted, the 5520 automatically connects to ExtremeCloud IQ to find its persona. The pre-provisioned OS persona is then remotely enabled on the 5520 system – eliminating the need for manual selection.

Audio Video Bridging

The 5520 series supports IEEE 802.1 Audio Video Bridging when running Switch Engine for reliable, real-time audio/ video transmission over Ethernet. AVB technology delivers the quality of service required for today's high-definition and time-sensitive multimedia streams.

Ethernet Fabric Services

The 5520 supports a variety of Ethernet Fabric services, including Extreme's Fabric Connect when running Fabric Engine and Extreme's IP Fabric when running Switch Engine. It also supports Fabric Attach for automated connection to either Layer 2 or Layer 3 fabric services. Extreme's Fabric Connect and IP Fabric on the 5520 enable the creation of virtualized networks that automate network operations, simplify network provisioning and enhance security, all while reducing the strain on network and IT personnel.

Power over Ethernet (PoE)

The 5520 Series includes Power over Ethernet (PoE) models with standards-based IEEE 802.3bt (30/60/90W) PoE support. This enables the 5520 to address the needs of powered edge devices, while eliminating the need for additional electrical cabling and circuits. 5520 PoE models also support perpetual and fast PoE for even more efficient and reliable powered edge device operation.

VIM Options for Flexible Uplinks

Versatile Interface Modules (VIMs) on the 5520 provide flexible uplink capabilities – with 5520 models offering a single VIM slot for this purpose. VIM options include 4-port 10Gb or 25Gb modules that include LRM and 256-bit MACsec support.

High-Performance Stacking

The 5520 also supports high-speed 200Gb* stacking when running Switch Engine via its two built-in QSFP28 ports. Up to eight systems can be stacked using qualified QSFP+ direct attach cables and optical transceivers.

*200Gb stacking available with Switch Engine 31.6

[1] Switch Engine is the new name for ExtremeXOS on all universal switch platforms, starting with Version 31.6

[2] Fabric Engine is the new name for the VSP Operating System on all universal switch platforms, starting with Version 8.6.

Product Specifications

External Interfaces

Switch Model	Interfaces

5520-24T
5520-24T-BASE
	• 24 x 10/100/1000Base-T ports
	  • Full/Half-Duplex (autosensing)
	  • MACsec-capable
	• 2 x Stacking/QSFP28 ports* (unpopulated)
	• 1 x Serial console port (RJ-45)
	• 1 x 10/100/1000BASE-T out-of-band management port
	• 2 x USB A ports for management or external USB flash
	• 1 x USB Micro-B console port
	• 1 x VIM slot

5520-24W	• 24 x 10/100/1000Base-T 802.3bt (90W) ports
	  • Full/Half-Duplex (autosensing)
	  • MACsec-capable
	• 2 x Stacking/QSFP28 ports* (unpopulated)
	• 1 x Serial console port (RJ-45)
	• 1 x 10/100/1000BASE-T out-of-band management port
	• 2 x USB A ports for management or external USB flash
	• 1 x USB Micro-B console port
	• 1 x VIM slot

5520-48T
5520-48T-BASE
	• 48 x 10/100/1000Base-T ports
	  • Full/Half-Duplex (autosensing)
	  • MACsec-capable
	• 2 x Stacking/QSFP28 ports* (unpopulated)
	• 1 x Serial console port (RJ-45)
	• 1 x 10/100/1000BASE-T out-of-band management port
	• 2 x USB A ports for management or external USB flash
	• 1 x USB Micro-B console port
	• 1 x VIM slot

5520-48W	• 48 x 10/100/1000Base-T 802.3bt (90W) ports
	  • Full/Half-Duplex (autosensing)
	  • MACsec-capable
	• 2 x Stacking/QSFP28 ports* (unpopulated)
	• 1 x Serial console port (RJ-45)
	• 1 x 10/100/1000BASE-T out-of-band management port
	• 2 x USB A ports for management or external USB flash
	• 1 x USB Micro-B console port
	• 1 x VIM slot

5520-12MW-36W	• 12 x 100M/1/2.5/5GBase-T 802.3bt (90W) PoE ports
	  • Full-Duplex
	  • MACsec-capable
	• 36 x 10/100/1000Base-T 802.3bt (90W) PoE ports
	  • Full/Half-Duplex
	  • MACsec-capable
	• 2 x Stacking/QSFP28 ports* (unpopulated)
	• 1 x Serial console port (RJ-45)
	• 1 x 10/100/1000BASE-T out-of-band management port
	• 2 x USB A ports for management or external USB flash
	• 1 x USB Micro-B console port
	• 1 x VIM slot

5520-48SE 5520-48SE-BASE	• 48 x 100/1000Base-X (SFP) ports (unpopulated) • MACsec-capable • 2 x Stacking/QSFP28 ports* (unpopulated) • 1 x Serial console port (RJ-45) • 1 x 10/100/1000BASE-T out-of-band management port • 2 x USB A ports for management or external USB flash • 1 x USB Micro-B console port • 1 x VIM slot

Product Specifications (cont.)

External Interfaces (cont.)

Switch Model	Interfaces
5520-24X 5520-24X-BASE	• 24 x 100M/1G/10GBase-X (SFP+) ports** (unpopulated) • 2 x Stacking/QSFP28 ports* (unpopulated) • 1 x Serial console port (RJ-45) • 1 x 10/100/1000BASE-T out-of-band management port • 2 x USB A ports for management or external USB flash • 1 x USB Micro-B console port • 1 x VIM slot
5520-VIM-4X	• 4 x 1/10GBase-X SFP+ ports (unpopulated)

5520-VIM-4XE	• 4 x 1/10Gbase-X SFP+ ports (unpopulated)
	  • LRM-capable
	  • MACsec-capable

5520-VIM-4YE	• 4 x 10/25Gbase-X SFP28 ports (unpopulated) • MACsec-capable

* Notes on use of the 2 x Stacking/QSFP28 ports

1. With Switch Engine, the 2 x QSFP28 ports can be used for stacking or as Ethernet uplink ports (when not stacking); stacking data rate is 40Gb or 50 Gb per port
2. With Fabric Engine, the 2 x QSFP28 ports can be used as Ethernet uplink ports if in non-Fabric mode or if no VIM is present as of the VOSS 8.4.2 release.
3. Ethernet uplink QSFP28 data rate options per port, with channelization: 4 x 10Gb SFP+, 4 x 25Gb SFP28, 1 x 40Gb QSFP+ (supported with Switch Engine and Fabric Engine); 2 x 50Gb (Switch Engine only)

** 100M on 5520-24X access ports supported with Switch Engine and with Fabric Engine (minimum Release 8.6).

Performance and Scale

Switch Model	Max Active 10/100/1000Mb ports	Max Active 100Mb/1Gb/2.5Gb/5Gb ports	Max Active 100Mb/1Gb SFP ports	Max Active 1/10Gb SFP+ ports*	Max Active 25Gb SFP28 ports*	Max Active 40Gb QSFP+ ports**	Max Active 50Gb ports**	Max Active 40Gb/50Gb Stacking ports***	Aggregated Switch Bandwidth	Frame Forwarding Rate
5520-24T 5520-24T-BASE	24	0	0	12	12	2	4	2	648 Gbps	482.1 mpps
5520-24W	24	0	0	12	12	2	4	2	648 Gbps	482.1 mpps
5520-48T 5520-48T-BASE	48	0	0	12	12	2	4	2	696 Gbps	517.8 mpps
5520-48W	48	0	0	12	12	2	4	2	696 Gbps	517.8 mpps
5520-12MW-36W	36	12	0	12	12	2	4	2	792 Gbps	589.3 mpps
5520-48SE 5520-48SE-BASE	0	0	48	12	12	2	4	2	696 Gbps	517.8 mpps
5520-24X 5520-24X-BASE	0	0	24	36	12	2	4	2	1080 Gbps	803.5 mpps

* Includes 8 ports available through channelization of the 2 x QSFP28 ports when not used for stacking with Switch Engine, or with VOSS 8.4.2 or later

** Available through channelization of the 2 x QSFP28 ports when these ports are not used for stacking in Switch Engine, or with VOSS 8.4.2 or later

*** 50Gb stacking with Switch Engine mode only 31.6 or later

Software Scaling Values

5520 with Switch Engine

- MAC Table: 114,688/65,536
- IPv4 ARP Table: 60,000/41,000*
- IPv4 Route Table: 81,000/16,000*
- IP Multicast Entries (S,G,V): 43,000/24,000*
- IPv6 ND Table: 18,000
- IPv6 Route Table: 40,000/8,000*
- ACL (Ingress/Egress): 9,216/1,024
- QoS Egress Queues/Port: 8
- VLANs: 4,094
- Routed VLANS: 2,048

One Policy Scaling

- Policy Profiles: 63
- Unique permit/deny rules per switch: 8,120
- Authenticated policy users/switch: 9,216

* First value is the maximum; second is the default. Scaling limits are configurable. See the Switch Engine Release Notes for additional details

5520 with Fabric Engine

- MAC Table: 40,960 (81,920 non-Fabric)
- IPv4 ARPARP/IP Host Table: 16,000/48,000
- IPv4 Route Table: 15,500
- IP Multicast Routes: 4,000
- IPv6 ND Table: 16,000
- IPv6 Route Table: 7,500
- IPv4 ACL (Ingress/Egress): 1,024/336
- QoS Egress Queues/Port: 8
- VLANs: 4,059
- Routed VLANS: 500

Fabric Connect Scaling

- Fabric Adjacencies per switch: 128
- Fabric nodes per area (BEB + BCB): 800
- BEB Nodes per VSN: 500
- L2 VSN: 3500
- L3 VSN: 256

Product Specifications (cont.)

Weights and Dimensions

Switch Model	Weight*	Physical Dimensions	
Switches			
		Chassis Only	With PSU
5520-24T 5520-24T-BASE	12.2 lb / 5.54 kg	17.4 in W / 1.7 in H / 17.4 in D 441 mm x 44 mm x 442 mm	17.4 in W / 1.7 in H /18.1 in D 441 mm x 44 mm x 449 mm
5520-24W	13.8 lb / 6.25 kg		
5520-48T 5520-48T-BASE	12.7 lb / 5.76 kg		
5520-48W	13.4 lb / 6.06 kg		
5520-12MW-36W	14.0 lb / 6.33 kg		
5520-48SE 5520-SE-BASE	12.6 lb / 5.7 kg		
5520-24X 5520-24X-BASE	13.8 lb / 6.25 kg		
VIM Modules			
5520-VIM-4X	0.37 lb / 0.17 kg	1.92 in W / 1.61 in H / 5.76 in D 48.8mm / 40.8mm / 146.3 mm	
5520-VIM-4XE	0.44 lb / 0.20 kg		
5520-VIM-4YE	0.46 lb / 0.21 kg		
Power Supplies			
10953 (350W AC)	2.38 lb / 1.08 kg	3.25 in W / 1.56 in H / 11.3 in D 40mm / 82.5mm / 287mm	
10951 (715W AC)	2.55 lb / 1.16 kg		
10941 (1100W AC)	2.55 lb / 1.16 kg		
"XN-ACPWR-2000W-F (2000W AC)"	2.56 lb / 1.16kg	3.25 in W / 1.56 in H / 11.5 in D 40mm / 75mm / 292mm	

*Switch weights include fans but no PSUs

Power Supply Unit Specifications

	10953	10951	10941	XN-ACPWR-2000-F*
Voltage Input Range (Nominal)	100-127/200-240 VAC	100-127/200-240 VAC	100-127/200-240 VAC	100-127/200-240 VAC
Line Frequency Range	50 to 60 Hz	50 to 60 Hz	50 to 60 Hz	50 to 60 Hz
Power Supply Input Socket	IEC/EN 60320 C14	IEC/EN 60320 C16	IEC/EN 60320 C16	IEC/EN 60320 C16
Power Cord Input Plug	IEC/EN 60320 C15	IEC/EN 60320 C15	IEC/EN 60320 C15	IEC/EN 60320 C15
Operating Temperature	0° C to 55° C Normal Operation	0° C to 50° C Normal Operation	0° C to 50° C Normal Operation	0° C to 55° C Normal Operation

*200-240 VAC is required to achieve full 2000W output. If run at 100-120VAC, output is limited to 1100W.

Power Supply Unit Specifications (cont.)

	XN-ACPWR-350W-FB	XN-ACPWR-350W-BF	XN-ACPWR-715W-FB	XN-ACPWR-1100W-FB	XN-ACPWR-2000W-FB*
Voltage Input Range (Nominal)	100-240 VAC	100-240 VAC	100-240 VAC	100-240 VAC	100-240 VAC
Line Frequency Range	50 to 60 Hz	50 to 60 Hz	50 to 60 Hz	50 to 60 Hz	50 to 60 Hz
Power Supply Input Socket	IEC/EN 60320 C14	IEC/EN 60320 C14	IEC/EN 60320 C16	IEC/EN 60320 C16	IEC/EN 60320 C16
Power Cord Input Plug	IEC/EN 60320 C15	IEC/EN 60320 C15	IEC/EN 60320 C15	IEC/EN 60320 C15	IEC/EN 60320 C15
Operating Temperature	0° C to 55° C Normal Operation	0° C to 55° C Normal Operation	0° C to 50° C Normal Operation	0° C to 50° C Normal Operation	0° C to 50° C Normal Operation

*200-240 VAC is required to achieve full 2000W output. If run at 100-120VAC, output is limited to 1100W.

PoE Power Budget

Switch Model	1 x 715W	2 x 715W	1 x 1100W	2 x 1100W	1 x 2000W @ 100-120VAC	1 x 2000W @ 200-240VAC	2 x 2000W @ 100-120VAC	2 x 2000W @ 200-240VAC
5520-24W	494W	1079W	879W	1781W	879W	1779W	1869W	2160W
5520-48W	483W	1068W	868W	1770W	868W	1768W	1858W	3568W
5520-12MW-36W	464W	1049W	849W	1751W	849W	1749W	1839W	3549W

Note: It is recommended that primary and secondary power supply units (PSUs) be of the same type to support optimal PoE operation.

Product Specifications (cont.)

Minimum/Maximum Power Consumption and Heat Dissipation

Switch Model	Minimum Power Consumption (Watts)	Minimum Heat Dissipation (BTU/hr)	Maximum Power Consumption (Watts)*	Maximum Heat Dissipation (BTU/hr)**
5520-24T 5520-24T-BASE	52	176	142	483
5520-24W	54	182	2480	1092
5520-48T 5520-48T-BASE	60	205	171	584
5520-48W	59	203	4100	1817
5520-12MW-36W	66	224	4095	1862
5520-48SE 5520-48SE-BASE	61	209	255	872
5520-24X 5520-24X-BASE	48	165	171	585

*Includes maximum PoE load (W) through the switch

**Does not include PoE load heat dissipated through external electronic load

Fan and Acoustic Noise

Switch Model	Acoustic Information	
5520-24T 5520-24T-BASE	Typical: Single 350W AC PSU, no VIM Maximum: Dual 350W AC PSU, 5520-VIM-4YE	
	Bystander Sound Pressure • 39.6dB(A), 0˚C to 35˚C (Typical) • 77.5 dB(A), 50˚C (Maximum)	Sound Power • 5.1 B, 0˚C to 35˚C (Typical) • 8.46 B, 50˚C (Maximum)
5520-24W	Typical: Single 715W AC PSU, no VIM Maximum: Dual 1100W AC PSU, 5520-VIM-4YE	
	Bystander Sound Pressure • 50.4dB(A), 0˚C to 35˚C (Typical) • 67.1 dB(A), 25˚C (Maximum) • 78.9 dB(A), 50˚C (Maximum)	Sound Power • 6 B, 0C to 35˚C (Typical) • 7.61 B, 25˚C (Maximum) • 8.6 B, 50˚C (Maximum)
5520-48T 5520-48T-BASE	Typical: Single 350W AC PSU, no VIM Maximum: Dual 350W AC PSU, 5520-VIM-4YE	
	Bystander Sound Pressure • 39.0dB(A), 0˚C to 35˚C (Typical) • 79.0 dB(A), 50˚C (Maximum)	Sound Power • 4.9 B, 0˚C to 35˚C (Typical) • 8.52 B, 50˚C (Maximum)
5520-48W	Typical: Single 1100W AC PSU, no VIM Maximum: Dual 2000W AC PSU (240VAC), 5520-VIM-4YE	
	Bystander Sound Pressure • 64.3dB(A), 0˚C to 35˚C (Typical) • 69.1 dB(A), 25˚C (Maximum) • 79.4 dB(A), 50˚C (Maximum)	Sound Power • 7.24 B, 0˚C to 35˚C (Typical) • 7.65 B, 25˚C (Maximum) • 8.6 B, 50˚C (Maximum)
5520-12MW-36W	Typical: Single 1100W AC PSU, no VIM Maximum: Dual 2000W AC PSU (240VAC), 5520-VIM-4YE	
	Bystander Sound Pressure • 62.7dB(A), 0˚C to 35˚C (Typical) • 69.2 dB(A), 25˚C (Maximum) • 78.8 dB(A), 50˚C (Maximum)	Sound Power • 7.25 B, 0˚C to 35˚C (Typical) • 7.64 B, 25˚C (Maximum) • 8.6 B, 50˚C (Maximum)
5520-48SE 5520-48SE-BASE	Typical: Single 350W AC PSU, no VIM Maximum: Dual 350W AC PSU, 5520-VIM-4YE	
	Bystander Sound Pressure • 41.4dB(A), 0˚C to 35˚C (Typical) • 77.9 dB(A), 50˚C (Maximum)	Sound Power • 5.14 B, 0˚C to 35˚C (Typical) • 8.53 B, 50˚C (Maximum)
5520-24X 5520-24X-BASE	Typical: Single 350W AC PSU, no VIM Maximum: Dual 350W AC PSU, 5520-VIM-4YE	
	Bystander Sound Pressure • 40.6dB(A), 0˚C to 35˚C (Typical) • 76.9 dB(A), 50˚C (Maximum)	Sound Power • 5.05 B, 0˚C to 35˚C (Typical) • 8.52 B, 50˚C (Maximum)

*5520-BASE models only operate up to 40° Centigrade (Maximum)

Environmental and Regulatory

Environmental

Environmental Specifications

- EN/ETSI 300 019-2-1 v2.1.2 - Class 1.2 Storage
- EN/ETSI 300 019-2-2 v2.1.2 - Class 2.3 Transportation
- EN/ETSI 300 019-2-3 v2.1.2 - Class 3.1e Operational
- EN/ETSI 300 753 (1997-10) - Acoustic Noise
- ASTM D3580 Random Vibration Unpackaged 1.5 G

Environmental Compliance

- EU RoHS - 2011/65/EU
- EU WEEE - 2012/19/EU
- EU REACH - Regulation (EC) No 1907/2006 - Reporting
- China RoHS - SJ/T 11363-2006
- Taiwan RoHS - CNS 15663(2013.7)

Environmental Operating Conditions

- Temp: 0° C to 50° C (32° F to 122° F) for Front-Back cooling
- Temp: 0° C to 45° C (32° F to 104° F) for Back-Front cooling (5520-24T, 5520-24x, 5520-48T, 5520-48SE)
- Humidity: 10% to 95% relative humidity, non-condensing
- Altitude: 0 to 3,000 meters (9,850 feet)
- Shock (half sine) 30m/s2 (3G), 11ms, 60 shocks
- Random vibration: 3 to 500 Hz at 1.5 G rms

Packaging and Storage Specifications

- Temp: -40° C to 70° C (-40° F to 158° F)
- Humidity: 10% to 95% relative humidity, non-condensing
- Packaged Shock (half sine): 180 m/s2 (18 G), 6 ms, 600 shocks
- Packaged Vibration: 5 to 62 Hz at velocity 5 mm/s, 62 to 500 Hz at 0.2 G
- Packaged Random Vibration: 5 to 20 Hz at 1.0 ASD w/–3 dB/oct. from 20 to 200 Hz
- Packaged Drop Height: 14 drops minimum on sides and corners at 42 inches (<15 kg box)

Regulatory and Safety

North American ITE

- UL 60950-1
- UL/CuL 62368-1 Listed
- Complies with FCC 21CFR 1040.10 (U.S. Laser Safety)
- CDRH Letter of Approval (US FDA Approval)
- CAN/CSA 22.2 No. 60950-1

European ITE

- EN 60950-1, EN 62368-1
- EN 60825-1 Class 1 (Lasers Safety)
- 2014/35/EU Low Voltage Directive

International ITE

- CB Report and Certificate per IEC 60950-1
- IEC 62368-1

EMI/EMC Standards

North American EMC for ITE

- FCC CFR 47 Part 15 Class A (USA)
- CB Report and Certificate IEC 62368-1
- RoHS Directive 2011/65/EU
- AS/NZS 60950-1 (Australia /New Zealand)

European EMC Standards

- EN 55035
- EN 55032 Class A
- EN 55024
- EN 55011
- EN 61000-3-2,2014 (Harmonics)
- EN 61000-3-3 2013 (Flicker)
- EN 300 386 (EMC Telecommunications)
- 2014/30/EU EMC Directive

International EMC Certifications

- CISPR 32, Class A (International Emissions)
- AS/NZS CISPR32
- CISPR 24 Class A (International Immunity)
- IEC 61000-4-2/EN 61000-4-2 Electrostatic Discharge, 8kV Contact, 15 kV Air, Criteria B
- IEC 61000-4-3 /EN 61000-4-3 Radiated Immunity 10V/m, Criteria A
- IEC 61000-4-4/EN 61000-4-4 Transient Burst, 1 kV, Criteria AB
- IEC 61000-4-5 /EN 61000-4-5 Surge, 2 kV L-L, 2 kV L-G, Level 3, Criteria B
- IEC 61000-4-6 Conducted Immunity, 0.15-80 MHz, 10V/m unmod. RMS, Criteria A
- IEC/EN 61000-4-11 Power Dips & Interruptions, >30%, 25 periods, Criteria C

Country Specific

- VCCI Class A (Japan Emissions)
- ACMA RCM (Australia Emissions)
- CCC Mark (China)
- KCC Mark, EMC Approval (Korea)
- EAC Mark (Custom Union)
- NRCS (South Africa)
- BSMI Mark (Taiwan)
- Anatel (Brazil)
- NoM (Mexico)

IEEE 802.3 Media Access Standards

- IEEE 802.3ab 1000BASE-T
- IEEE 802.3bz 2.5G/5GBASE-T
- IEEE 802.3bt Type4 PoE
- IEEE 802.3ae 10GBASE-X
- IEEE 802.3aq 10GBASE-LRM
- IEEE 802.3by 25GBASE-X
- IEEE 802.3ba/802.3bm 40GBASE-X and 100GBASE-X
- IEEE 802.3az Energy Efficient Ethernet

Ordering Notes

Customers ordering a 5520 switch receive the base switch along with Base software license, fan modules and rack-mount kit. **In addition, each 5520 switch comes with a free 1-year ExtremeCloud IQ Pilot subscription**.

Versatile Interface Modules (VIMs), power supplies, transceiver/optics, power cords, as well as Premier and/or MACsec licenses must be ordered separately. At least one Power Supply Unit (PSU) is required for 5520 operation; a second PSU is required for redundancy and/or additional power.

Base Software and Optional Premier License

The Base software included with each 5520 unit supports most available switch features. Certain features, however, require a Premier license to operate.

For Switch Engine, a Premier License is required for:

- 5 or more OSPF interfaces
- PIM DM / PM SSM
- Anycast RP (Rendezvous Point)
- Multi-Source Discovery Protocol (MSDP)
- IS-IS/BGP4/MBGP*
- GRE Tunneling
- Ethernet VPN (EVPN)
- Multi-Protocol Label Switching (MPLS)***

For Fabric Engine, a Premier license is required for:

- 5 or more OSFP or RIP interfaces
- 3 or more BGP peers
- 25 or more VRFs**
- Layer 3 Virtual Service Networks (L3 VSNs)
- Distributed Virtual Routing (DvR) Controller

* Up to 2 BGP interfaces included in Base software with the EXOS 31.4 Release

** VRFs included in Base software with the VOSS 8.4 Release

*** MPLS available with Switch Engine 31.6 release

Ordering Information

Part Number	Product Name	Product Description
5520 Systems		
5520-24T	5520 24-port Switch	5520 Universal Switch with 24 x 10/100/1000BASE-T full/half duplex MACsec-capable ports, includes 2 x Stacking/QSFP28 ports, 2 fan modules, 1 VIM slot, 2 unpopulated modular PSU slots, Base software license, includes 1-year XIQ Pilot subscription
5520-24T-BASE	5520 24-port Switch	5520 Universal Switch with 24 x 10/100/1000BASE-T full/half duplex MACsec-capable ports, includes 2 x Stacking/QSFP28 ports, 2 unpopulated fan slots, 1 VIM slot, 2 unpopulated modular PSU slots, Base software license, includes 1-year XIQ Pilot subscription
5520-24W	5520 24-port 90w PoE Switch	5520 Universal Switch with 24 x 10/100/1000BASE-T full/half duplex 802.3bt 90W PoE MACsec-capable ports, includes 2 x Stacking/QSFP28 ports, 3 fan modules, 1 VIM slot, 2 unpopulated modular PSU slots, Base software license, includes 1-year XIQ Pilot subscription
5520-48T	5520 48-port Switch	5520 Universal Switch with 48 x 10/100/1000BASE-T full/half duplex MACsec-capable ports, includes 2 x Stacking/QSFP28 ports, 3 fan modules, 1 VIM slot, 2 unpopulated modular PSU slots, Base software license, includes 1-year XIQ Pilot subscription
5520-48T-BASE	5520 48-port Switch	5520 Universal Switch with 48 x 10/100/1000BASE-T full/half duplex MACsec-capable ports, includes 2 x Stacking/QSFP28 ports, 3 unpopulated fan slots, 1 VIM slot, 2 unpopulated modular PSU slots, Base software license, includes 1-year XIQ Pilot subscription
5520-48W	5520 48-port 90w PoE Switch	5520 Universal Switch with 48 x 10/100/1000BASE-T full/half duplex 802.3bt 90W PoE MACsec-capable ports, includes 2 x Stacking/QSFP28 ports, 3 fan modules, 1 VIM slot, 2 unpopulated modular PSU slots, Base software license, includes 1-year XIQ Pilot subscription
5520-12MW-36W	5520 48-port 90w PoE with 12 ports multi-rate Switch	5520 Universal Switch with 12 x 100Mb/1Gb/2.5Gb/5Gb 802.3bt 90W PoE MACsec-capable ports plus 36 x 10/100/1000BASE-T 802.3bt 90W PoE full/half duplex MACsec-capable ports, includes 2 x Stacking/QSFP28 ports, 3 fan modules, 1VIM slot, 2 unpopulated modular PSU slots, Base software license, includes 1-year XIQ Pilot subscription
5520-48SE	5520 48-port SFP Switch	5520 Universal Switch with 48 x 100M/1Gb SFP MACsec-capable ports, includes 2 x Stacking/ QSFP28 ports, 3 fan modules, 1 VIM slot, 2 unpopulated modular PSU slots, Base software license, includes 1-year XIQ Pilot subscription
5520-48SE-BASE	5520 48-port SFP Switch	5520 Universal Switch with 48 x 100M/1Gb SFP MACsec-capable ports, includes 2 x Stacking/ QSFP28 ports, 3 unpopulated fan slots, 1 VIM slot, 2 unpopulated modular PSU slots, Base software license, includes 1-year XIQ Pilot subscription
5520-24X	5520 24-port SFP+ Switch	5520 Universal Switch with 24 x 100Mb/1Gb/10Gb SFP+ ports, includes 2 Stacking/QSFP28 ports, 2 fan modules, 1 VIM slot, 2 unpopulated modular PSU slots, Base software license, includes 1-year XIQ Pilot subscription
5520-24X-BASE	5520 24-port SFP+ Switch	5520 Universal Switch with 24 x 100Mb/1Gb/10Gb SFP+ ports, includes 2 Stacking/QSFP28 ports, 2 unpopulated fan slots, 1 VIM slot, 2 unpopulated modular PSU slots, Base software license, includes 1-year XIQ Pilot subscription
5520-VIM-4X	4-port SFP+ module	5520 Versatile Interface Module with 4 x 1/10Gb SFP+ ports
5520-VIM-4XE	4-port SFP+ module LRM/MACsec capable	5520 Versatile Interface Module with 4 x 1/10Gb SFP+ LRM and MACsec-capable ports
5520-VIM-4YE	4-port SFP28 module MACsec capable	5520 Versatile Interface Module with 4 x 10/25Gb SFP28 MACsec-capable ports

Ordering Information (cont.)

Part Number	Product Name	Product Description
Accessories		
10953	350W AC PSU FB	350W AC PSU supported on 5520
10951	715W AC PSU FB	715W AC PSU supported on 5520
10941	1100W AC PSU FB	1100W AC PSU supported on 5520
XN-ACPWR-2000W-F	2000W AC PSU FB	2000W AC PSU supported on 5520
XN-ACPWR-350W-FB*	350W AC PSU FB	350 Watt AC Power Supply Module - Front to Back airflow, also used on X465 and VSP 4900
XN-ACPWR-715W-FB*	715W AC PSU FB	715 Watt AC PoE Power Supply Module - Front to Back airflow, also used on X465 and VSP 4900
XN-ACPWR-1100W-FB*	1100W AC PSU FB	1100 Watt AC PoE Power Supply Module - Front to Back airflow, also used on X465 and VSP 4900
XN-ACPWR-2000W-FB*	2000W AC PSU FB	2000 Watt AC PoE Power Supply Module - Front to Back airflow, also used on X465 and VSP 4900
XN-ACPWR-350W-BF***	350W AC PSU BF	350W Back to Front cooling AC PSU supported on 5520 Non-PoE switches
17115	Spare Fan Module FB	Fan module for 5520, Front to Back airflow
17116***	Spare Fan Module BF	Fan module for 5520, Back to Front airflow
XN-4P-RMKIT-005	4-Post Rack Mount Kit	Spare 4-Post Rack Mount Kit for 5520
XN-2P-RMKIT-005**	2-Post Rack Mount Kit	Optional 2-Post Rack Mount Kit for 5520
Software Licenses		
5000-PRMR-LIC-P	Premier License for 5000 Series	Perpetual Premier License for 5000 Series switches
5000-MACSEC-LIC-P	MACsec License for the 5000 Series	Perpetual MACsec license for the 5000 Series switches

* XN-ACPWR-xxx-FB power supply units cannot be used with the 10941, 10951, 10953, or XN-ACPWR-2000W-F PSUs on the same switch. Not available for Mexico, Russia, Brazil, China, Korea, South Africa, India at present, pending certification.

** The optional 2-post rack mount kit can be used with 5520 chassis HW rev AD or higher.

*** XN-ACPWR-350W-BF and related 17116 fan SKU requires a minimum of Switch Engine Release 32.3 or Fabric Engine Release 8.9 to operate.

Warranty

All 5520 Series models are covered under Extreme's Universal LLW policy. For warranty details, please visit: www.extremenetworks.com/support/policies.

Optics/Transceivers

For a list of the optics/transceivers supported on the 5520 Series hardware, refer to our Extreme Optics Compatibility Tool at https://optics.extremenetworks.com.

Power Cords

In support of Extreme Networks Green initiatives, power cords are not included with the 5520, but can be ordered separately. They should be specified at time of ordering.

Maintenance Services

Extreme's maintenance and support services with 100% in-sourced engineering experts and over 90% first-person resolution ensure efficient operation of your business-essential network. 24x7x365 phone support, advanced parts replacement, and on-site support augment your staff with experienced resources that help you mitigate critical network issues fast. Visit Extreme Maintenance Services for more information.

Extreme networks

http://www.extremenetworks.com/contact

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5720 Series

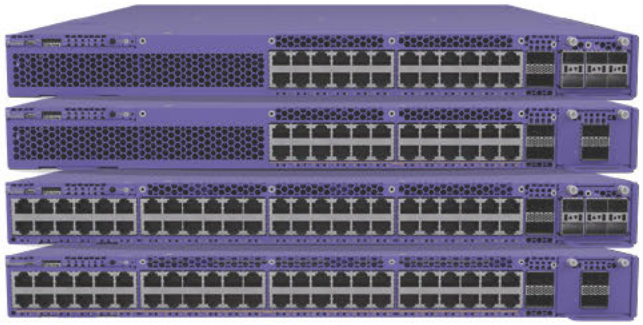
Universal Edge/Aggregation Switch Platform

Highlights

- Fixed 24 and 48-port Gigabit and Multi-Gigabit Ethernet switches for enterprise edge and aggregation deployments
- Universal dual-persona hardware allows user choice of switch operating systems
- ExtremeCloud IQ™ and ExtremeCloud IQ - Site Engine for powerful, secure and easy to use cloud-based network management.
- Fabric Connect for automated network operations, simplified network provisioning and enhanced security
- 1-year free ExtremeCloud IQ Pilot subscription included with each 5720 system

Key Hardware Features

- A choice of 6 x 1/10Gb/25G or 2 x 100Gb modular uplink options
- 30/60/90W PoE support (IEEE 802.3bt)
- Up to 8-unit 400Gb per unit stacking
- Hot-swappable, redundant power supplies and fans
- MACsec on access and modular uplink ports for secure link encryption
- Non-blocking, wire-speed design



The 5720 Series is a family of high-performance, feature-rich edge and aggregation switches designed for the next-generation digital enterprise. As a universal hardware platform, the 5720 Series provides end-to-end secure network segmentation, in addition to advanced policy capabilities, and offers a user-selectable choice of Extreme's flagship switch operating systems. This makes the 5720 a uniquely flexible platform that can be deployed across a range of edge, aggregation and wiring-closet environments.

The 5720 Series includes 24- and 48-port 1/2.5/5 Multi-gig models, as well as 24- and 48-port models 1/2.5/5/10 Multi-gig models. All models offer 90W PoE in support of next-gen powered Ethernet devices, such as digital signage, pan-tilt-zoom cameras, smart lighting or point-of-sale terminals. The 5720 further includes 1/10/25Gb and 100Gb modular uplink options for high-speed, flexible linkage to other switches or devices over a range of media.

Management

The 5720 can be managed by ExtremeCloud IQ and ExtremeCloud IQ – Site Engine for comprehensive unified management with a consolidated view of users, devices and applications across wired and wireless networks. (NOTE: Each 5720 unit also includes a 1-year free ExtremeCloud IQ Pilot subscription.)

Zero-touch provisioning from ExtremeCloud IQ lets one quickly bring new 5720 switches online as well as enable the selection of the operating system (OS) persona. Alternatively, 5720 on-box management can be done manually via a web-based GUI or generic CLI.

Power over Ethernet

All 5720 Series models support 30, 60, and 90W Power over Ethernet (PoE) that conforms with IEEE 802.3bt. This enables the 5720 to address the needs of powered edge devices, while eliminating the need for additional electrical cabling and circuits. In addition, 5720 PoE models support perpetual and fast PoE for even more efficient and reliable powered edge device operation.

High-Performance Stacking

Two built-in QSFP28 stacking ports on 5720 models can be used for up to 400Gb per unit stacking when running Switch Engine. Up to eight systems can be stacked using qualified direct attach cables and optical transceivers.

Note: Stacking is not supported when running Fabric Engine.

Audio Video Bridging

The 5720 series supports IEEE 802.1 Audio Video Bridging when running Switch Engine for reliable, real-time audio/video transmission over Ethernet. AVB technology deliversthe quality of service required for today's high-definition and time-sensitive multimedia streams.

Universal Hardware Platform

The 5720 Series as a universal hardware platform comes with a dual-persona capability allowing user choice of the switch operating system (OS). Either Switch Engine (EXOS)* or Fabric Engine (VOSS)* persona can be enabled on 5720 hardware models. The desired persona can be selected at start-up or changed at a later stage. Once selected, the 5720 assumes the features/capabilities of the selected OS.

5720 persona activation can be done manually at boot-up, including via the system CLI. Or, it can be automated by pre-provisioning the 5720 persona in ExtremeCloud IQ. When first booted, the 5720 automatically connects to ExtremeCloud IQ to find its persona. The pre-provisioned OS persona is then remotely enabled on the 5720 system – eliminating the need for manual selection.

* Switch Engine and Fabric Engine are the new names for ExtremeXOS (EXOS) and VSP Operating System (VOSS), respectively, on all universal switch platforms.

Ethernet Fabric Services

The 5720 supports a variety of Ethernet Fabric services, including Extreme's Fabric Connect when running Fabric Engine and Extreme's IP Fabric when running Switch Engine. It also supports Fabric Attach for automated connection to either Layer 2 or Layer 3 fabric services. Extreme's Fabric Connect and IP Fabric on the 5720 enable the creation of virtualized networks that automate network operations, simplify network provisioning, and enhance security, all while reducing the strain on network and IT personnel.

Integrated Application Hosting

Select 5720 Series models support Extreme's Integrated Application Hosting* which leverages the switch's hardware and software design to run onboard applications without impacting switch performance. 5720-24MXW and 5720-48MXW models can run a Guest VM directly on the switch in support third-party or customized applications to meet specific business or operational needs. This can provide additional network insight or enable new network applications without need for a separate hardware device.

* Initially available with Fabric Engine; available with Switch Engine in a future release

External Interfaces

Switch Model	Interfaces

5720-24MW	• 24 x 100M/1/2.5/5Gbase-T 802.3bt (90W) ports
	  • Full-duplex
	  • MACsec-capable
	• 2 x Stacking/QSFP28 ports (unpopulated)
	• 1 x Serial console port (RJ-45)
	• 1 x 10/100/1000BASE-T out-of-band management port
	• 2 x USB A ports for management or external USB flash
	• 1 x USB Micro-B console port
	• 1 x VIM slot

5720-48MW	• 48 x 100M/1/2.5/5Gbase-T 802.3bt (90W) ports
	  • Full-duplex
	  • MACsec-capable
	• 2 x Stacking/QSFP28 ports (unpopulated)
	• 1 x Serial console port (RJ-45)
	• 1 x 10/100/1000BASE-T out-of-band management port
	• 2 x USB A ports for management or external USB flash
	• 1 x USB Micro-B console port
	• 1 x VIM slot

5720-24MXW	• 24 x 100M/1/2.5/5/10Gbase-T 802.3bt (90W) ports
	  • Full-duplex
	  • MACsec-capable
	• 2 x Stacking/QSFP28 ports (unpopulated)
	• 1 x Serial console port (RJ-45)
	• 1 x 10/100/1000BASE-T out-of-band management port
	• 2 x USB A ports for management or external USB flash
	• 1 x USB Micro-B console port
	• 1 x VIM slot
	• 1 x SSD slot

5720-48MXW	• 48 x 100M/1/2.5/5/10Gbase-T 802.3bt (90W) full-duplex ports
	  • Full-duplex
	  • MACsec-capable
	• 2 x Stacking/QSFP28 ports (unpopulated)
	• 1 x Serial console port (RJ-45)
	• 1 x 10/100/1000BASE-T out-of-band management port
	• 2 x USB A ports for management or external USB flash
	• 1 x USB Micro-B console port
	• 1 x VIM slot
	• 1 x SSD slot

5720-VIM-6YE	• 6 x 1/10/25G SFP28 ports • MACsec-capable

5720-VIM-2CE	• 2 x 100Gb QSFP28 ports
	  • MACsec-capable
	  • 10/25/40Gb data rates supported via channelization

Performance and Scale

Switch Model	Max Active 1Gb/2.5Gb/5Gb ports	Max Active 1Gb/2.5Gb/ 5Gb/10Gb ports	Max Active 10Gb SFP+ ports[1]	Max Active 25Gb SFP28 ports[1]	Max Active 40Gb QSFP+ ports[2]	Max Active 50Gb ports[3]	Max Active 100Gb QSFP28 ports[2]	Max Active 100Gb Stacking ports[4]	Aggregated Switch Bandwidth	Frame Forwarding Rate
5720-24MW	24	0	16	16	2	4	4	2	1040 Gbps	774 mpps
5720-48MW	48	0	16	16	2	4	4	2	1280 Gbps	810 mpps
5720-24MXW	0	24	16	16	2	4	4	2	1280 Gbps	810 mpps
5720-48MXW	0	48	16	16	2	4	4	2	1760 Gbps	810 mpps

[1] When stacking is enabled, 8 of the 10Gb SFP+ and 8 of the 25Gb SFP28 ports are unavailable

[2] When stacking is enabled, 2 of the 40Gb QSFP+ ports and 2 of the 100Gb ports are unavailable

[3] 50Gb available only in Switch Engine mode via the two integrated stacking/QSFP28 ports; when stacking is enabled, the 50Gb ports are unavailable as uplinks

[4] Stacking supported in Switch Engine mode only. Stacking ports can also run at 50Gb in support of cross-stacking with the 5520.

5720 Software Scaling Values

5720-MXW (24 and 48-port) with Switch Engine

MAC Table: 294,000

IPv4 ARP Table: 172,000

IPv4 Route Table: 294,000

IP Multicast Entries (S,G,V): 110,000

IPv6 Neighbor Table: 78,000

IPv6 Route Table: 218,000

ACLs (Ingress/Egress): 38,864/2,048

QoS Egress Queues per port: 8

VLANs: 4,094

Routed VLANs: 4,094

One Policy Scaling

Policy Profiles: 63

Unique Permit/Deny Rules per switch: 16,312

5720-MW (24 and 48-port) with Switch Engine

MAC Table: 163,000

IPv4 ARP Table: 80,000

IPv4 Route Table: 166,000

IP Multicast Entries (S,G,V): 61,000

IPv6 Neighbor Table: 24,000

IPv6 Route Table: 109,000

ACLs (Ingress/Egress): 18,432/2,048

QoS Egress Queues per port: 8

VLANs: 4,094

Routed VLANs: 4,094

One Policy Scaling

Policy Profiles: 63

Unique Permit/Deny Rules per switch: 12,216

5720-MXW (24 and 48-port) with Fabric Engine

MAC Table: 164,000

IPv4 ARP Table: 65,536

IPv4 Route Table: 24,576

IP Multicast Entries (S,G,V): 6,000

IPv6 Neighbor Table: 32,768

IPv6 Route Table: 12,288

ACLs (Ingress/Egress): 8,192/6,144

QoS Egress Queues per port: 8

VLANs: 4,059

IP Interfaces (Routed VLANs): 1,000

5720-MW (24 and 48-port) with Fabric Engine

MAC Table: 100,000

IPv4 ARP Table: 24,600

IPv4 Route Table: 16,384

IP Multicast Entries (S,G,V): 6,000

IPv6 Neighbor Table: 24,576

IPv6 Route Table: 8,192

ACLs (Ingress/Egress: 6,144/3,072

QoS Egress Queues per port: 8

VLANs: 4,059

IP Interfaces (Routed VLANs): 1,000

Fabric Connect Scaling (all 5720 models)

Fabric Adjacencies per switch: 255

Fabric nodes per area (BEB + BCB): 1,000

BEB Nodes per VSN: 2,000

L2 VSNs: 4,000

LE VSNs: 256

Weights and Dimensions

Part Number	Weight	Physical Dimensions
5720-24MW	17.75 lb/8.05 kg	17.53 in W/1.7 in H/20.7 in D 44.5 cm/4.3 cm/52.7 cm
5720-48MW	18.85 lb/8.55 kg	
5720-24MXW	17.75 lb/8.05 kg	
5720-48MXW	18.85 lb/8.55 kg	
5720-VIM-6YE	0.53 lb/0.24 kg	2.02 in W/1.64 in H/6.86 in D 5.2 cm/4.2 cm/17.4 cm
5720-VIM-2CE	0.49 lb/0.22 kg	

Power Supply Unit Specifications

	715W AC PSU	1100W AC PSU	2000W AC PSU*
Voltage Input Range (Nominal)	100-127/200-240 VAC	100-127/200-240 VAC	100-127/200-240 VAC
Line Frequency Range	50 to 60 Hz	50 to 60 Hz	50 to 60 Hz
Power Supply Input Socket	IEC/EN 60320 C16	IEC/EN 60320 C16	IEC/EN 60320 C16
Power Cord Input Plug	IEC/EN 60320 C15	IEC/EN 60320 C15	IEC/EN 60320 C15
Operating Temperature	0° C to 55° C Normal Operation	0° C to 50° C Normal Operation	0° C to 50° C

* 200-240 VAC is required to achieve full 2000W output. If run at 100-120VAC, output is limited to 1100W

Minimum/Maximum Power Consumption and Heat Dissipation

Switch Model	Minimum Power Consumption (Watts)	Minimum Heat Dissipation (BTU/hr)	Maximum Power Consumption (Watts)*	Maximum Heat Dissipation (BTU/hr)**
5720-24MW	86	293	2549	389
5720-24MXW	105	359	2576	416
5720-48MW	103	354	4078	543
5720-48MXW	105	359	4096	561

* Includes maximum PoE load (W) through the switch

** Does not include PoE load heat dissipated through external electronic load

PoE Power Budget

Switch Model	1 x 715W	2 x 715W	1 x 1100W	2x1100W	1 x 2000W @ 110-132VAC	2 x 2000W @ 110-132VAC	1 x 2000W @ 220-264VAC	2 x 2000W @ 220-264VAC
5720-24MW	450W	1093W	835W	1825W	835W	1825W	1735W	2160W
5720-24MXW	450W	1093W	835W	1825W	835W	1825W	1735W	2160W
5720-48MW	450W	1093W	835W	1825W	835W	1825W	1735W	3535W
5720-48MXW	450W	1093W	835W	1825W	835W	1825W	1735W	3535W

Note: It's recommended that primary and secondary PSUs be of the same type to support optimal PoE operation.

Acoustics and Noise

Switch Model	Bystander Sound Pressure (dB)	Weighted Sound Power level (B)
5720-24MW	48.8	6.3
5720-48MW	55.1	6.7
5720-24MXW	48.5	6.3
5720-48MXW	54.7	6.7

Note: All ports link up with full traffic, 50% PoE Budget Load, Dual 2000W PSU, 25°C

Product Specifications

Environmental

Environmental Specifications

EN/ETSI 300 019-2-1 v2.1.2 - Class 1.2 Storage

EN/ETSI 300 019-2-2 v2.1.2 - Class 2.3 Transportation

EN/ETSI 300 019-2-3 v2.1.2 - Class 3.1e Operational

EN/ETSI 300 753 (1997-10) - Acoustic Noise

ASTM D3580 Random Vibration Unpackaged 1.5 G

Environmental Compliance

EU RoHS - 2011/65/EU

EU WEEE - 2012/19/EU

EU REACH – Regulation (EC) No 1907/2006 Reporting

China RoHS - SJ/T 11363-2006

Taiwan RoHS - CNS 15663(2013.7)

Environmental Operating Conditions

Temp: 0° C to 50° C (32° F to 122° F)

Humidity: 10% to 95% relative humidity, non-condensing

Altitude: 0 to 3,000 meters (9,850 feet)

Shock (half sine) 30m/s2 (3G), 11ms, 60 shocks

Random vibration: 3 to 500 Hz at 1.5 G rms

Packaging and Storage Specifications

Temp: -40° C to 70° C (-40° F to 158° F)

Humidity: 10% to 95% relative humidity, non-condensing

Packaged Shock (half sine): 180 m/s2 (18 G), 6 ms, 600 shocks

Packaged Vibration: 5 to 62 Hz at velocity 5 mm/s, 62 to 500 Hz at 0.2 G

Packaged Random Vibration: 5 to 20 Hz at 1.0 ASD w/–3 dB/oct. from 20 to 200 Hz

Packaged Drop Height: 14 drops minimum on sides and corners at 42 inches (<15 kg box)

Regulatory and Safety

North American ITE

UL 60950-1

UL/CuL 62368-1 Listed

CSA 22.2 No. 60950-1 2nd edition 2014 (Canada)

Complies with FCC 21CFR 1040.10 (U.S. Laser Safety)

CDRH Letter of Approval (US FDA Approval)

European ITE

EN 60950-1 2nd Edition

EN 62368-1

EN 60825-1Class 1 (Lasers Safety)

2014/35/EU Low Voltage Directive

International ITE

CB Report & Certificate per IEC 60950-1

CB Report & Certificate IEC 62368-1

AS/NZS 60950-1 (Australia/New Zealand)

EMI/EMC Standards

North American EMC for ITE

FCC CFR 47 Part 15 Class A (USA)

ICES-003 Class A (Canada)

European EMC Standards

EN 55032 Class A

EN 55024

EN 61000-3-2,2014 (Harmonics)

EN 61000-3-3 2013 (Flicker)

EN 300 386 (EMC Telecommunications)

2014/30/EU EMC Directive

International EMC Certifications

CISPR 32, Class A (International Emissions)

AS/NZS CISPR32

CISPR 24 Class A (International Immunity)

IEC 61000-4-2/EN 61000-4-2 Electrostatic Discharge, 8kV Contact, 15 kV Air, Criteria B

IEC 61000-4-3/EN 61000-4-3 Radiated Immunity 10V/m, Criteria A

IEC 61000-4-4/EN 61000-4-4 Transient Burst, 2 kV, Criteria B

IEC 61000-4-5/EN 61000-4-5 Surge, 2 kV L-L, 2 kV L-G, Level 3, Criteria B

IEC 61000-4-6 Conducted Immunity, 0.15-80 MHz, 10V/rms, 80%AM (1kHz), Criteria A

IEC/EN 61000-4-11 Power Dips & Interruptions, >30%, 25 periods, Criteria C

Country Specific

VCCI Class A (Japan Emissions)

ACMA RCM (Australia Emissions)

CCC Mark (China)

KCC Mark, EMC Approval (Korea)

BSMI (Taiwan)

Anatel (Brazil)

NoM (Mexico)

EAC (Russia, Belarus, Kazkhastan)

NRCS (South Africa)

IEEE 802.3 Media Access Standards

IEEE 802.3ab 1000BASE-T

IEEE 802.3bz 2.5G/5G/10GBASE-T

IEEE 802.3bt Type 4 PoE

IEEE 802.3ae 10GBASE-X

IEEE 802.3by 25GBASE-X

IEEE 802.3ba/802.3bm 40GBASE-X and 100GBASE-X

IEEE 802.3az Energy Efficient Ethernet

Ordering Information

Part Number	Product Name	Description
5720 Systems		
5720-24MW	5720 24-port 1G/2.5G/5G Switch with 90W PoE	5720 Universal Switch with 24 x 1/2.5/5Gb 802.3bt 90W PoE ports, 2 x Stacking/QSFP28 ports, 1 unpopulated VIM slot, MACsec-capable, includes 2 x unpopulated PSU slots, fan modules 4-post rack mount kit, Base software license, 1-year ExtremeCloud IQ Pilot Subscription
5720-48MW	5720 48-port 1G/2.5G/5G Switch with 90W PoE	5720 Universal Switch with 48 x 1/2.5/5Gb 802.3bt 90W PoE ports, 2 x Stacking/QSFP28 ports, 1 unpopulated VIM slot, MACsec-capable, includes 2 x unpopulated PSU slots, fan modules 4-post rack mount kit, Base software license, 1-year ExtremeCloud IQ Pilot Subscription
5720-24MXW	5720 24-port 1G/2.5G/5G/10G Switch with 90W PoE	5720 Universal Switch with 24 x 1/2.5/5/10Gb 802.3bt 90W PoE ports, 2 x Stacking/QSFP28 ports, 1 unpopulated VIM slot, MACsec-capable, includes 2 x unpopulated PSU slots, 1 x unpopulated SSD slot, fan modules, 4-post rack mount kit, Base software license, 1-year ExtremeCloud IQ Pilot Subscription
5720-48MXW	5720 48-port 1G/2.5G/5G/10G Switch with 90W PoE	5720 Universal Switch with 48 x 1/2.5/5/10Gb 802.3bt 90W PoE ports, 2 x Stacking/QSFP28 ports, 1 unpopulated VIM slot, MACsec-capable, includes 2 x unpopulated PSU slots, 1 x unpopulated SSD slot, fan modules, 4-post rack mount kit, Base software license, 1-year ExtremeCloud IQ Pilot Subscription
VIM Modules		
5720-VIM-6YE	6-port SFP28 module MACsec-capable	5720 Versatile Interface Module with 6 x 1/10/25Gb SFP28 MACsec-capable ports
5720-VIM-2CE	2-port QSFP28 module MACsec-capable	5720 Versatile Interface Module with 2 x 100Gb QSFP28 MACsec-capable ports
Accessories		
XN-ACPWR-715W-FB	715W AC PSU FB	715 Watt AC Power Supply Module (PSU) – Front-to-Back airflow – also used in 5520, X465 and VSP 4900
XN-ACPWR-1100W-FB	1100W AC PSU FB	1100 Watt AC Power Supply Module (PSU) – Front-to-Back airflow – also used in 5520, X465 and VSP 4900
XN-ACPWR-2000W-FB	2000W AC PSU FB	2000 Watt AC Power Supply Module (PSU) – Front-to-Back airflow – also used in 5520, X465 and VSP 4900
XN-FAN-005-F	Spare Fan module	Spare Fan module used in 5720 Series switches
XN-SSD-002-120	120GB SSD Module	120GB Solid-State Drive (SSD) module for use with Integrated Application Hosting on the 5720-24MXW and 5720-48MXW model switches
XN-2P-RKMT299	Optional Two-Post Rack Mount Kit	Optional Two-Post rack mount kit for use with 5720 Series switches
XN-4P-RKMT299	Spare Four-Post Rack Mount Kit	Spare Four-Post rack mount kit for use with 5720 Series switches
Software Licenses		
5000-PRMR-LIC-P	Premier License for 5000 Series	Perpetual Premier License for 5000 Series switches
5000-MACSEC-LIC-P	MACsec License for the 5000 Series	Perpetual MACsec License for the 5000 Series switches

Ordering Notes

Customers ordering a 5720 switch receive the base switch along with Base software license, fan modules and rack-mount kit. In addition, each 5720 switch comes with a free 1-year ExtremeCloud IQ Pilot subscription.

Versatile Interface Modules (VIMs), power supplies, transceiver/optics, power cords, as well as Premier and/or MACsec licenses must be ordered separately. At least one Power Supply Unit (PSU) is required for 5720 operation; a second PSU is required for redundancy and/or additional power.

Base Software and Optional Premier License

The Base software included with each 5720 unit supports most available switch features. Certain features, however, require a Premier license to operate.

For Switch Engine, a Premier License is required for:

- 5 or more OSPF interfaces
- 3 or more BGP Peers
- PIM DM / PM SSM
- Anycast RP (Rendezvous Point)
- Multi-Source Discovery Protocol (MSDP)
- IS-IS/BGP4/MBGP
- GRE Tunneling
- Ethernet VPN (EVPN)
- Integrated Application Hosting (once available)

For Fabric Engine, a Premier license is required for:

- 5 or more OSFP or RIP interfaces
- 3 or more BGP peers
- Layer 3 Virtual Service Networks (L3 VSNs)
- Distributed Virtual Routing (DvR) Controller
- Integrated Application Hosting

Warranty

All 5720 Series models are covered under Extreme's Universal LLW policy. For warranty details, please visit: http://www.extremenetworks.com/support/policies.

Maintenance Services

Extreme's maintenance and support services with 100% in-sourced engineering experts and over 90% first-person resolution ensure efficient operation of your business-essential network. 24x7x365 phone support, advanced parts replacement, and on-site support augment your staff with experienced resources that help you mitigate critical network issues fast. Visit Extreme Maintenance Services for more information.

Optics/Transceivers

For a list of the optics/transceivers supported on the 5720 Series hardware, refer to our Extreme Optics Compatibility Tool at https://optics.extremenetworks.com.

Power Cords

In support of Extreme Networks Green initiatives, power cords are not included with the 5720, but can be ordered separately. They should be specified at time of ordering.

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Highlights

Advanced Radio Technology

Tri-Radio Design

- 2.4 GHz (2x2:2)
- 5 GHz (2x2:2)
- 6 GHz (2x2:2)

Operational modes

- Mode 1: 2.4 GHz/5 GHz/6 GHz Data Radios
- Mode 2: 2.4 GHz/5GHz Data radios + Tri-frequency band sensor (2.4 GHz/5 GHz/6 GHz)

Universal Hardware Platform

- On-Premise: WiNG OS (Centralized)
- Cloud: IQ Engine

Superior Tri-Frequency Radio Performance

- Multi-band filter reduces interference and enables 5 GHz and 6 GHz operation across all available channels without restrictions
- Multi-Band functionality out-of-the-box without the need for a software or hardware upgrade

WPA3 Support

- Includes the latest WPA3 Wi-Fi security standard delivering robust protections for users and IoT devices

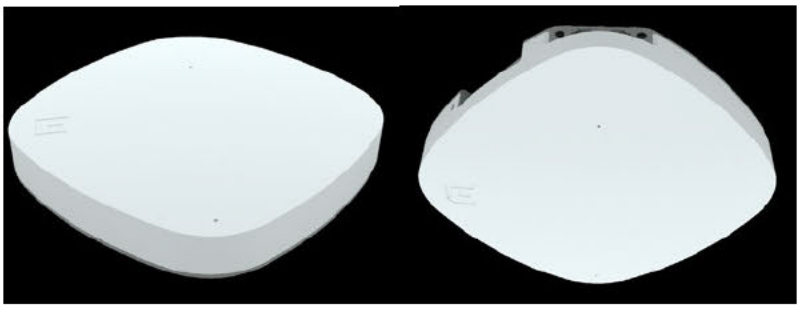
Cellular Coexistence Filter (CCF)

- Minimizes the impact of interference from cellular networks

Fully Functional over 802.3at

Smart Management Choices

- ExtremeCloud IQ delivers powerful, simple, and secure public or private cloud management capabilities
- ExtremeCloud IQ Controller is ideal for on-premises requirements



Universal Wireless AP4000

Wi-Fi 6E Tri-Radio Indoor Access Point with Support for Multiple Extreme Operating Systems

In today's world, as businesses make capital investments in their technology infrastructure, they must have a keen eye on how those investments can improve operational efficiency and reduce cost. With Extreme's Universal infrastructure, customers can take advantage of hardware agility and reduce the total cost of their network by adopting platforms that allow them to run multiple Extreme operating systems. This multi-persona capability provides increased product flexibility and reduced hardware obsolescence.

The AP4000 is the industry's first Enterprise Universal and World SKU Wi-Fi 6E Wireless Access point. This innovation simplifies the sales ordering process and reinforces Extreme's commitment to the journey to the "Infinite Enterprise". The World SKU allows customers, partners, and distributors to order one model for any region, replacing the age-old problem of country specific SKUs. ExtremeCloud™ IQ geo-locates the Access Point and accurately provides it the corresponding set of channel and power specifications that the product can operate under in that country.

The AP4000 Wi-Fi 6E access point, with three 2x2:2 radios, provides high-efficiency, high-performance 802.11ax aggregate data rates up to 3.9 Gbps in the 6 GHz, 5 GHz, and 2.4 GHz band. Designed for high density environments, such as schools, warehouses, healthcare facilities, and stadiums, the AP4000 is powerful and intelligent enough to provide the highest level of client services without compromising security. Despite powerful capabilities, the AP4000 allows for flexible placement with a small form-factor, emphasizing aesthetics.

With more users, more devices, more things, more applications, and more threats straining the infrastructure, the AP4000 was engineered to meet those challenges. The AP4000 combines powerful 802.11ax Wi-Fi 6E technology, advanced security, and ML/AI management capabilities together as an enterprise-class solution that allows you to deploy high speed, highly secure Wi-Fi into high-density environments.

Unlike other access points that scan only part-time, the AP4000 features a dedicated tri-frequency sensor that monitors for rogue devices full time, eliminating the risk of vulnerability and attacks. This tri-radio AP is capable of multiple operating modes, optimizing for maximum performance without trading off security. The AP4000 is the first enterprise Wi-Fi 6E access point that features a fully functional Multi-Band filter, enabling simultaneous operations with no performance degradation between all the 5 GHz frequencies and the entire range of 6 GHz frequencies (U-NII-5 thru U-NII-8 bands).*

* Country dependent

Wi-Fi 6E Enhanced Capacity

By utilizing the additional 6 GHz spectrum offered by Wi-Fi 6E, the AP4000 operates across three times as much spectrum as previous generations of Wi-Fi to deliver enhanced wireless experiences, faster speeds, and less interference.

Band	Number of 20 MHz Channels	Maximum Channel Size	Maximum throughput
6 GHz	59	160 MHz	2.4 Gbps
5 GHz	25	80 MHz	1.2 Gbps
2.4 GHz	3	20 MHz	287 Mbps
Total	87		3.9

*For US regulatory environments (20 MHz channels)



Wi-Fi 6E (802.11ax) Technology

Wi-Fi 6 ushered a new generation of Wi-Fi, with prior generations emphasized on higher speeds, 802.11ax technology instead focused on improving Wi-Fi efficiency as well as speed, taking Wi-Fi networks to an entirely new level. Now, with addition of the 6GHz band for unlicensed operation, Wi-Fi 6E has access to up to 1200 MHz of spectrum*, which is three times that of existing 'usable' spectrum which enables improved quality of service in dense environments, new applications and use cases, and an improved user experience. To learn more about 802.11ax and Wi-Fi 6E, visit here to learn more.



Security

The AP4000 delivers the highest level of security services, beginning with support for the latest Wi-Fi Alliance WPA3 security certifications. Leverage Extreme Fabric Attach to securely automate provisioning and deployment by connecting to a Fabric Connect-enabled switch. Additionally, supporting a stateful L2-L7 DPI firewall for context-based access security, tri-frequency security and location analytics sensor, Private Pre-Shared Key (PPSK) and much more.



Management Analytics

In conjunction with Extreme centralized management software, cloud or on-premises, the AP4000 provides a rich set of data displayed via context driven widgets, representing unlimited historical data or a combination of historical and current data. This provides context-specific granularity with perspective views for locations, network, APs, individual client devices, as well as policy roles. In each context, administrators can adjust dashboards make a widget library.



Universal Hardware

The AP4000 as a universal hardware platform comes with a dual-persona capability allowing user choice of the Wi-Fi operating system (OS). Either the IQ Engine operating system or the WiNG Operating System persona can be enabled as required. The desired persona can be selected at start-up or changed at a later stage. Once selected, the AP4000 assumes the features/capabilities of the selected OS. When first booted, the AP4000 automatically connects to ExtremeCloud™ IQ to find its persona. The pre-provisioned OS persona is then remotely enabled on the AP4000 system, eliminating the need for manual selection.



Tri-Radio Programmable AP

Extreme launched the industry's first software defined Wi-Fi 6E access point supporting two software programmable modes to optimally manage radios to provide the highest level of client performance. The AP4000 is a tri-radio AP can transmit with three data radios or with two data radios and a dedicated tri-frequency sensor. The AP4000 intelligently monitors the software-configurable radios, enabling network managers to configure network RF technology based on the user environment and configure the access points in different modes as required.



Integrated Bluetooth Low Energy and USB Port

To support both IoT and Guest Engagement services the AP4000 integrates Bluetooth® to connect with IoT devices wireless to engage loyalty customers with Apple iBeacon[1]. Enterprises can use API driven applications to send advertisements directly to shoppers, guests, and conference attendees. This makes it ideal for businesses to advertise their app download pages, captive portals, or site-specific information.

[1] IoT Radio included for certain AP4000 model SKUs

Product Specifications

Radio Specifications

Max Users
- SSID per Radio/Total: 8/24
- Users per Radio/total: 512/1536

802.11a
- 5.150–5.850 GHz Operating Frequency
- Orthogonal Frequency Division Multiplexing (OFDM) Modulation
- Rates (Mbps): 54, 48, 36, 24, 18, 12, 9, 6 w/auto fallback

802.11b
- 2.4–2.5 GHz Operating Frequency
- Direct-Sequence Spread-Spectrum (DSSS) Modulation
- Rates (Mbps): 11, 5.5, 2, 1 w/auto fallback

802.11g
- 2.4–2.5 GHz Operating Frequency
- Orthogonal Frequency Division Multiplexing (OFDM) Modulation
- Rates (Mbps): 54, 48, 36, 24, 18, 12, 9, 6 w/auto fallback

802.11n
- 2.4–2.5 GHz and 5.150–5.850 GHz Operating Frequency
- 802.11n Modulation
- HT20 High-Throughput (HT) Support (for both 2.4 GHz and 5 GHz)
- HT40 High-Throughput (HT) Support for 5 GHz
- A-MPDU and A-MSDU Frame Aggregation

802.11ac
- 5.150–5.850 GHz Operating Frequency
- 802.11ac Modulation (256-QAM)
- Rates (Mbps): MCS0 – MCS31 (6.5MBps - 600Mbps)
- 5G: 2x2 Multiple-In, Multiple-Out (MIMO) Radio
- 2.4G: 2x2 Multiple-In, Multiple-Out (MIMO) Radio
- Rates (Mbps): MCS0–MCS9 (6.5Mbps – 1734Mbps), NSS = 1-2.
- 2x2:2 Stream Multiple-In, Multiple-Out (MIMO) Radio
- VHT20/VHT40/VHT80 support
- TxBF (Transmit Beamforming)

802.11ax
- 2.4-2.5GHz, 5.50-5.850 and 5.925-7.125 GHz Operating Frequencies
- 802.11ax Modulation (1024-QAM)
- Dual-band OFDMA
- Rates (Mbps):
  - 6G: HE0-HE11 (8 Mbps – 2400 Mbps)
  - 5G: HE0-HE11 (8 Mbps – 1200 Mbps)
  - 2.4G: HE0-HE11 (8Mbps – 574 Mbps)
- 2x2:2 Stream Multiple-In, Multiple-Out (MIMO) Radio@ 6GHz
- 2x2:2 Stream Multiple-In, Multiple-Out (MIMO) Radio@ 5GHz
- 2x2:2 Stream Multiple-In, Multiple-Out (MIMO) Radio @2.4GHz
- HE20/HE40/HE80/HE160 support for 6 GHz
- HE20/HE40/HE80 support for 5 GHz
- HE20/HE40 support for 2.4 GHz
- DL SU-MIMO and MU-MIMO
- TxBF (Transmit Beamforming)

IoT Radio[2]
- Thread, Zigbee®, Bluetooth® 5.2 Low Energy, IEEE 802.15.4

Interfaces
- Eth0, Eth1: (2) Wired Ethernet ports (RJ-45)
  - (1) 100/1000/2500Mbps auto-sensing link speed Ethernet port, POE 802.3at
  - (1) 10/100/1000 Mbps auto-sensing link speed Ethernet port
  - 802.3az Energy Efficient Ethernet(EEE)
- USB 2.0, Type A, 5V/500mA

Power Specifications
- IEEE 802.3at PoE Power

Power Options
- Power Draw: Typical: 12.3W; Max: 13.8W (w/o USB)
  Typical: 15W; Max: 16.6W (w USB)
- 802.3at Power over Ethernet (PoE) capable
- Gigabit Ethernet port (RJ-45 power input pins: Wires 4,5,7,8 or 1,2,3,6)

Physical
- Dimensions: 8" x 8" x 1.5" (205mm x 205mm x 37mm)
- Weight: 1.88 pounds (.85 kg)
- Kensington lock slot
- Trusted Platform Module(TPM)

Internal Antennas
- (2) Integrated single band, 5.925-7.125 GHz omnidirectional antennas
- (2) Integrated dual band, 2.4-2.5 GHz and 5.1-5.8 GHz omnidirectional
- (2) Integrated dual band, 2.4-2.5 GHz and 5.1-5.8 GHz omnidirectional for sensor
- (1) Integrated dual band, 2.4-2.5 GHz omnidirectional for IoT

[2] IoT Radio included for certain AP4000 model SKUs

Mounting
- AP support 15/16 flush ceiling tile include in box
- Wall mount included in box or sold as an accessory
- Ceiling Tile Recessed 15/16 sold as accessory
- Beam sold as an accessory
- Junction Box sold as an accessory
- IL or 9/16 t-bar sold as an accessory
- SL (Silhouette) sold as an accessory
- Wing Main Plate adaptor sold as an accessory
- Built in slot for Kensington

Environmental
- Operating: AP4000: 0 to 50°C
- Storage: -40 to 70°C
- Humidity: 0% to 95% (non-condensing)

Environmental Compliance
- EU RoHS – 2011/65/EU
- EU WEEE – 2012/19/EU
- EU REACH - Regulation (EC) No 1907/2006 – Reporting
- EU SCIP – EU Waste Framework Directive
- China RoHS – SJ/T 11363-2006
- Taiwan RoHS CNS 15663(2013.7)

Regulatory Compliance

Radio Standards

USA
- Part 15C - 15.247
- Part 15E - 15.407
- Part 15B EMC class B
- RF exposure - KDB 447498D01V06 FCC Part1.1310
- ANSI C63.4 test methods
- IEC 60601-1-2 EMC for medical devices

Canada
- RSS 247 for 2.4G 802.11
- IECS-003 class B
- RF exposure - RSS-102: Issue 5, 2015

CE
- 2014/53/EU Radio Equipment Directive
- EN 300 328, EN 301 893, EN 302 502, EN 300 440
- EN301 489 1, EN 301 489 17, EN 62311, EN 62479, EN 50385

Regulatory and Safety

North American ITE
- UL 60950-1 2nd edition Listed Device (U.S.)
- CSA 22.2 No. 60950-1 2nd edition 2014(Canada)
- UL/CuL 62368-1 Listed
- UL 2043 Plenum Rated

European ITE
- EN 62368-1
- 2014/35/EU Low Voltage Directive

International ITE
- CB Report and Certificate per IEC 60950-1 + National Differences
- CB Report and certificate IEC 62368-1
- AS/NZS 60950-1 (Australia /New Zealand)

EMI/EMC Standards

North American EMC Standards
- FCC CFR 47 part 15 Class A (USA)
- ICES-003 Class A (Canada)

European EMC Standards
- EN 55032 Class A
- EN 55035
- EN 55011
- EN 61000-3-2: (Harmonics)
- EN 61000-3-3 (Flicker)
- EN 300 386 (EMC Telecommunications)
- 2014/30/EU EMC Directive

International EMC Certifications
- CISPR 32 Class A (International Emissions)
- AS/NZS CISPR32
- CISPR 24 Class A (International Immunity)
- IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6
- IEC/EN 61000-4-11

Power and Sensitivity Tables

Power and Receive Sensitivity- 2.4 GHz Radio

Channel	Data Rate	Power (dBm)	Sensitivity
11b	1 - 11 Mbps	19	-94, -87
11g	6 Mbps	19	-91
	54 Mbps	16	-73
11n HT20	MCS0, 7	19, 16	-91, -72
11n HT40	MCS0, 7	18, 16	-88, -69
11ax HE20	HE0, 11	19, 14	-90, -60
11ax HE40	HE0, 11	18, 14	-87, -57

Power and Receive Sensitivity – 5 GHz Radio

Channel	Data Rate	Power (dBm)	Sensitivity
11a	6 Mbps	18	-94
	54 Mbps	17	-75
11n HT20	MCS0, 7	18, 16	-94, -75
11n HT40	MCS0, 7	18, 16	-91, -72
11ac VHT20	MCS0, 8	18, 15	-94, -71
11ac VHT40	MCS0, 9	18, 15	-91, -67
11ac VHT80	MCS0, 9	18, 15	-88, -64
11ax HE20	HE0, 11	18, 14	-93, -64
11ax HE40	HE0, 11	18, 14	-90, -60
11ax HE80	HE0, 11	18, 14	-87, -57

Power and Receive Sensitivity – 6 GHz Radio

Channel	Data Rate	Power (dBm)	Sensitivity
11a	6 Mbps	18	-93
	54 Mbps	16	-75
11n HT20	MCS0, 7	18, 15	-93, -75
11n HT40	MCS0, 7	17, 15	-91, -72
11ac VHT20	MCS0, 8	18, 14	-93, -71
11ac VHT40	MCS0, 9	17, 13	-91, -67
11ac VHT80	MCS0, 9	17, 13	-88, -64
11ac VHT160	MCS0, 9	17, 11	-85, -61
11ax HE20	HE0, 11	18, 12	-92, -63
11ax HE40	HE0, 11	17, 12	-90, -60
11ax HE80	HE0, 11	17, 12	-87, -57
11ax HE160	HE0, 11	17, 11	-84, -54

Power and Receive Sensitivity - 2.4 GHz Sensor

Channel	Data Rate	Power (dBm)	Power (dBm)
11b	1 - 11 Mbps	16	-95, -88
	6 Mbps	16	-94
11g	54 Mbps	16	-77
11n HT20	MCS0, 7	16, 15	-93, -75
11n HT40	MCS0, 7	16, 15	-90, -72
11ax HE20	HE0, 11	16, 14	-92, -62
11ax HE40	HE0, 11	16, 14	-89, -59

Power and Receive Sensitivity – 5 GHz Sensor

Channel	Data Rate	Power (dBm)	Sensitivity
11a	6 Mbps	20	-95
	54 Mbps	17	-76
11n HT20	MCS0, 7	20, 17	-95, -75
11n HT40	MCS0, 7	20, 17	-92, -72
11ac VHT20	MCS0, 8	20, 16	-94, -72
11ac VHT40	MCS0, 9	20, 15	-91, -67
11ac VHT80	MCS0, 9	20, 15	-88, -64
11ac VHT160	MCS0, 9	20, 15	-85, -61
11ax HE20	HE0, 11	20, 15	-94, -64
11ax HE40	HE0, 11	20, 15	-91, -61
11ax HE80	HE0, 11	20, 15	-88, -58
11ax HE160	HE0, 11	20, 15	-85, -55

Power and Receive Sensitivity – 6 GHz Radio Senso

Channel	Data Rate	Power (dBm)	Sensitivity
11a	6 Mbps	18	-93
	54 Mbps	16	-75
11n HT20	MCS0, 7	18, 15	-93, -75
11n HT40	MCS0, 7	17, 15	-91, -72
11ac VHT20	MCS0, 8	18, 14	-93, -71
11ac VHT40	MCS0, 9	17, 13	-91, -67
11ac VHT80	MCS0, 9	17, 13	-88, -64
11ac VHT160	MCS0, 9	17, 11	-85, -61
11ax HE20	HE0, 11	18, 12	-92, -63
11ax HE40	HE0, 11	17, 12	-90, -60
11ax HE80	HE0, 11	17, 12	-87, -57
11ax HE160	HE0, 11	17, 11	-84, -54

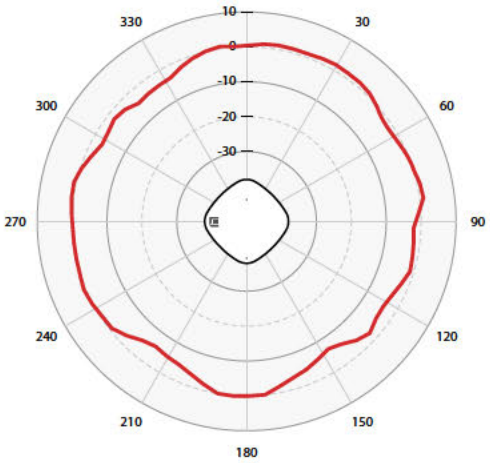
Maximum EIRP may vary based upon deployed country

AP4000 Antenna Gains

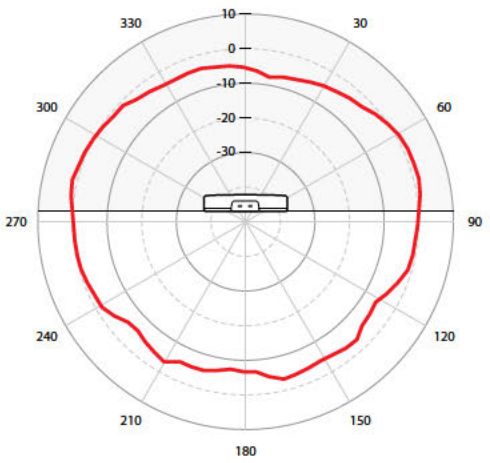
Mode	Radio 1	Radio 2	Radio 3	IoT
1	2.4G: 3.9dBi	5G: 5.1dBi	6G: 5.3dBi	5.3dBi
2	2.4G: 3.9dBi	5G: 5.1dBi	2.4G: 5.3dBi 5G: 5.9dBi 6G: 5.3dBi	5.3dBi

Antenna Radiation Patterns

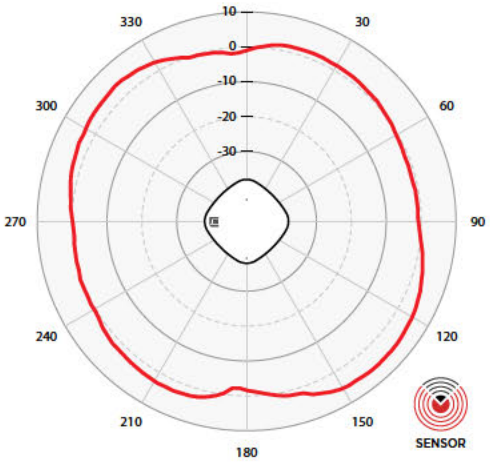
Azimuth – 6 GHz



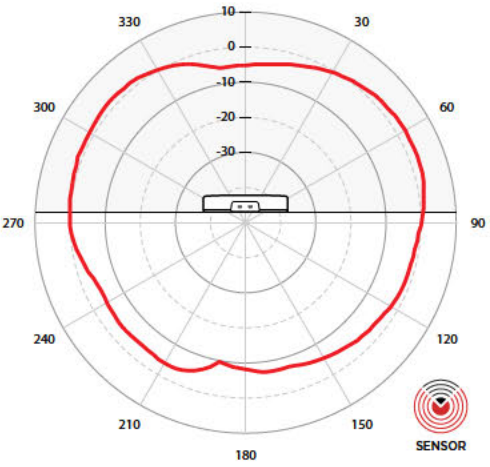
Elevation – 6 GHz



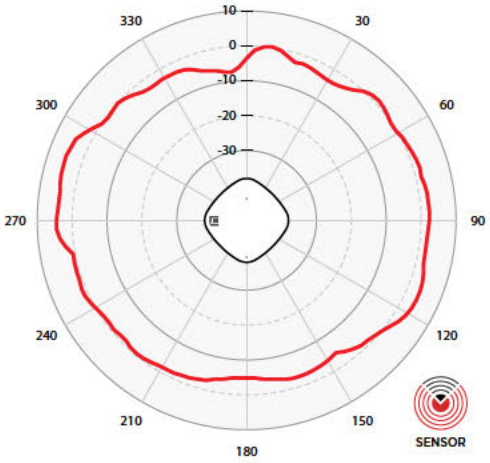
Azimuth – 2 GHz



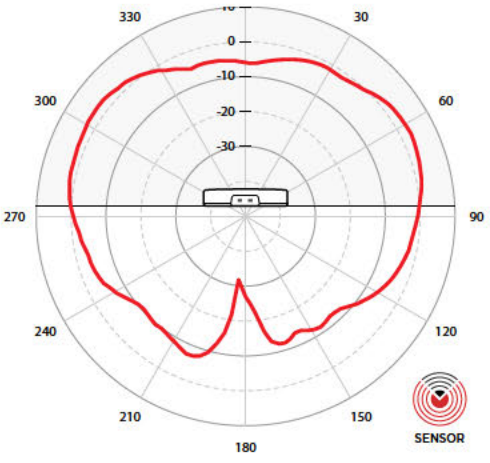
Elevation – 2 GHz



Azimuth – 5 GHz

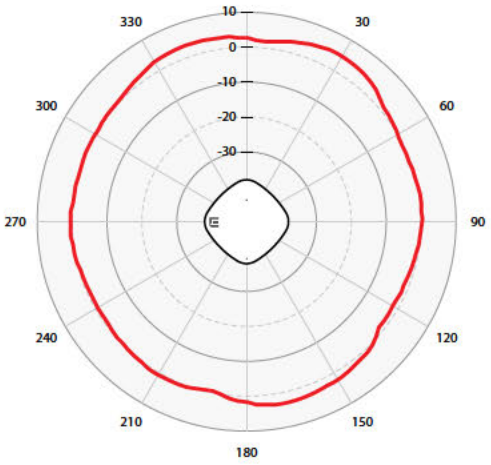


Elevation – 5 GHz

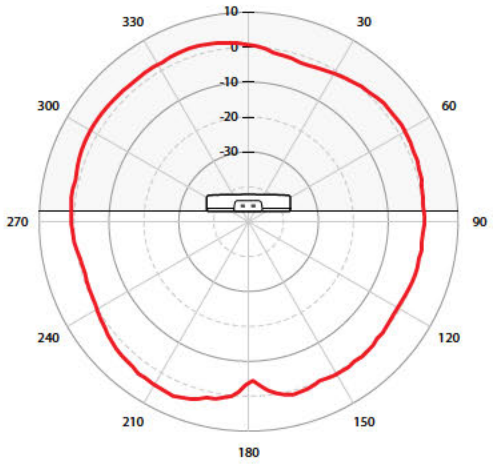


Antenna Radiation Patterns (Cont.)

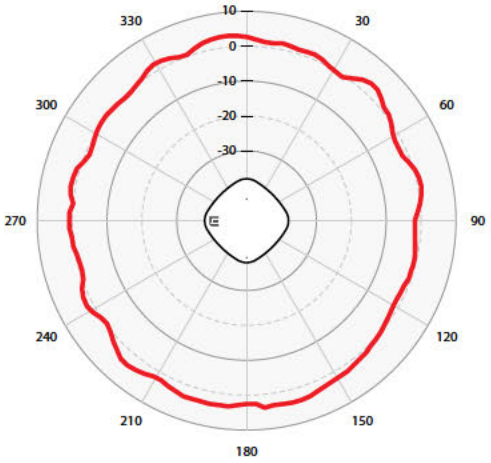
Dual Band Azimuth – 2 GHz



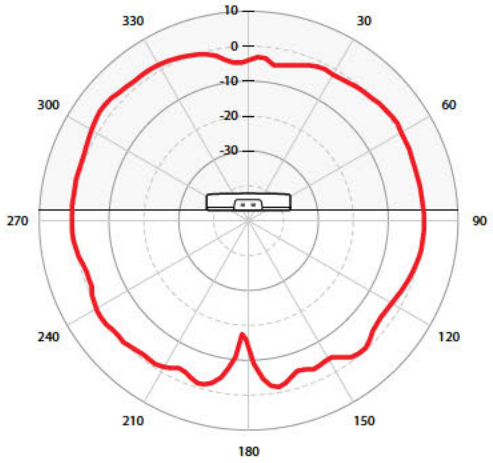
Dual Band Elevation – 2 GHz



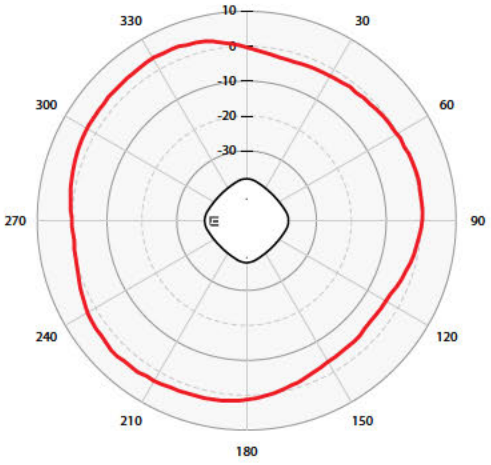
Dual Band Azimuth – 5 GHz



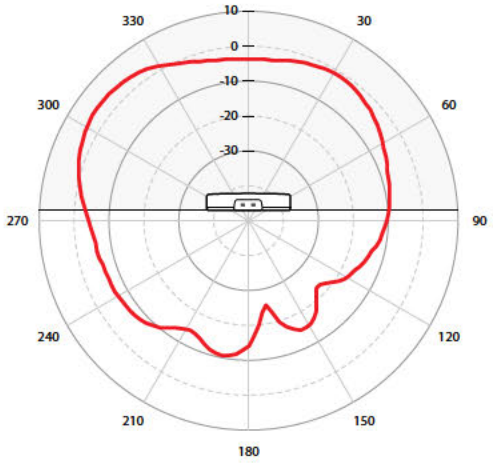
Dual Band Elevation – 5 GHz



BLE Azimuth – 2 GHz



BLE Elevation – 2 GHz



Ordering Information

AP4000 - SKUs

Part Number	Description
AP4000-WW	Indoor Tri Radio WiFi 6E AP, 2.4 GHz, 5GHz, 6GHz and Multirate Port. Integrated Light, power sensors, BLE/Zigbee. AI/ML green mode. INT antennas. T-Bar, Incl Mt (AH-ACC-BKT-AX-TB). Domain: World SKU
AP4000-1-WW*	Indoor Tri Radio WiFi 6E AP, 2.4 GHz, 5GHz, 6GHz & Multi-rate Port. Integrated Light, power sensors, AI/ML green mode. INT antennas. T-Bar, Incl Mt (AH-ACC-BKT-AX-TB). Domain: World SKU

* Non-BLE SKU. AP4000-1-WW has identical functionality as AP4000-WW, with the exception of IoT radio and Bluetooth functionality.

Accessories

Mounting Accessories		
Marketing Part #	**Indoor AP Mounting**	**Notes**
ACC-4000-ETH-CAP	Cable cover for AP4000 to hide Ethernet Port and Ethernet cable	Hides ethernet cable for aesthetically pleasing installation Includes a 7" Flat Cat6 RJ45 Cable (5 Pack Kit)
AH-ACC-BKT-AX-TB	Mounting bracket for prelude 15/16" and suprafine 9/16" ceilings and walls	Ships with AP4000 Can be used for wall - .25"
AH-ACC-BKT-AX-WL	Mounting bracket for direct-to-wall installations	Can be used for wall - 1.25"
AH-ACC-BKT-AX-IL	Mounting bracket for interlude ceilings	
AH-ACC-BKT-AX-SL	Mounting bracket for Armstrong 1/8" and 1/4" main beam silhouette reveal ceiling grids	Up to .33" ceiling tile protrusion
ACC-BKT-AX-JB	Junction box or wall mounting for indoor access points	Gang/Junction Box
ACC-BKT-AX-BEAM	Beam mounting for indoor access points	Up to 0.78" thick beam.
AH-ACC-BKT-916-KIT	9/16" ceiling mount brackets for Non-Flat/Protruded ceiling tiles - Use with AH-ACC-BKT-AX-TB	9/16" Non-Flat/Protruded ceiling tiles
ACC-BKT-TB-NF	Adaptor bracket AH-ACC-BKT-TB for 15/16" Wide T-Bars Non-Flat/Protruded ceiling tiles	5/16" Wide T-Bars Non-Flat/Protruded ceiling tiles
ACC-BKT-AX-WNGADAPT	Adaptor backet for Cloud AP to WING Mounting Plate (#37201). 10 pack	Allow twist mount to mount to legacy mounts

Power Accessories	
Part Number	**Description**
PD-9001GR-ENT	Single Port 802.3at Compliant Midspan
10061	Pwr Cord,10A,NEMA 5-15P,IEC320-C13,125V, 18AWG (for US)
10034	Pwr Cord,10A,BS1363,IEC320-C13,250V, 0.75MMSQ (for UK)
10033	Pwr Cord,10A,CEE 7/7,IEC320-C13,250V, 0.75MMSQ (for EU)
10036	Pwr Cord,10A,AS3112,IEC320-C13,250V, 0.75MMSQ (for AU)
10062	Pwr Cord,12A,JISC8303,IEC320-C13,125V, 1.25MMSQ (for Japan)
10033	Pwr Cord,10A,CEE 7/7,IEC320-C13,250V, 0.75MMSQ (for Korea)

Other Accessories	
Part Number	**Description**
ACC-WIFI-MICRO-USB	Micro-USB to USB Console Adapter Cable for Extreme Wireless Access Points

See Product Installation guide for more details

Warranty

The AP4000 is covered under Extreme's Universal LLW policy. For warranty details, please.visit:
www.extremenetworks.com/support/policies

Extreme networks

http://www.extremenetworks.com/contact

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Extreme networks

Data Sheet

AP4020

Key Highlights

- Wi-Fi 7 technology - high throughput, low latency, and extended range
- Cloud-managed - simplifies operations and reduces risk
- AIOps provides proactive insights for reducing MTTR
- Mobile app helps easily onboard, provision, and troubleshoot the wireless network

AP Radio Features

- Data Radios (2x2:2): 2.4 GHz, 5 GHz, 6 GHz and dedicated sensor
- Dual IoT Radios

Operational Modes

- Mode 1: 2.4 GHz /5 GHz/6 GHz data radios and sensor
- Mode 2: 2.4 GHz, and dual 5 GHz, and sensor

Cellular Coexistence Filter (CCF)

- Minimizes the impact of interference from cellular networks

Fully Functional with 802.3at: all data radios, sensor, and 2.5W USB

Built-in PoE Failover

Option to enable USB to 5W with 802.bt power



Flexible, Highly Secure and Cloud-Managed, Wi-Fi 7 Access Point

The AP4020 is an ExtremeCloud IQ managed, Wi-Fi 7 access point (AP) that delivers increased performance and security across a range of use cases for a seamless wireless experience. This AP is built on Extreme's industry-leading Universal Hardware technology, enabling investment protection and deployment flexibility. It simplifies operations, reduces risk and saves time by leveraging ExtremeCloud IQ with artificial intelligence for IT operations (AIOps). The AP4020 can also automatically enforce secure access rules from ExtremeCloud Universal ZTNA - to act as a gatekeeper for preventing attacks at the periphery of the network.

The AP4020 Wi-Fi 7 Access Point is engineered for peak performance in enterprise environments, featuring a quad-radio design with three 2x2:2 radios. With support across the 6 GHz, 5 GHz, and 2.4 GHz bands, it delivers the next generation of high-efficiency, high-performance connectivity using 802.11be, also known as Extremely High Throughput (EHT). In addition to its advanced speed and bandwidth capabilities, the AP4020 includes a full-time dedicated security sensor, ensuring robust protection while maintaining optimal network performance.

Extreme offers one of the most extensive selections of switches to connect Wi-Fi 6E and Wi-Fi 7 access points. The switches that connect the APs include flexible PoE that offer 30/60/90 watts of power on their multi-gigabit ports to support the higher power requirements of 6 GHz Wi-Fi.

Business Benefits and Outcomes

Improve Operational Efficiency

The AP4020 is part of a complete wired and wireless solution that combines AIOps provided by ExtremeCloud IQ, Extreme's Universal Wired portfolio, and advanced security from ExtremeCloud Universal ZTNA. Using powerful 802.11be Wi-Fi 7 technology, this solution allows deployment of high-speed and highly secure Wi-Fi into a broad range of environments including high-density venues. ExtremeCloud IQ improves operational efficiency through powerful cloud-based management capabilities across the wired and wireless infrastructure.

Reduce Risk

With more users, more devices, more applications, and more threats straining the network, the AP4020 was engineered to meet these performance and security challenges. Unlike other APs that scan only part time, the AP4020 features a dedicated tri-frequency sensor that monitors rogue devices full time, eliminating the risk of vulnerability and attacks.

The AP4020, as part of the Extreme Universal Wireless portfolio, allows the user to change an operating system use case without changing the hardware, providing deployment flexibility.

Enhance User Experiences

The enhanced user experience with a Wi-Fi 7 AP4020 access point is marked by ultra-high speeds, low latency, and exceptional connectivity, even in dense or complex environments. Leveraging Wi-Fi 7's Extremely High Throughput (EHT) technology, users enjoy faster downloads, smoother streaming, and more responsive real-time applications like video conferencing and data intensive tasks.

AIOps and Cloud Management

The AP4020 is managed by ExtremeCloud IQ with innovative AIOps capabilities that streamline operations by delivering new levels of network visibility, automation, and intelligence using Explainable ML (machine learning). ExtremeCloud IQ incorporates many AIOps features such as network and client insights that help users reduce mean time to resolution (MTTR).

Network and client insights provide device-generated telemetry data that is depicted in both real-time and historical dashboard views with the ability to drill-down to details. The Client Monitor feature helps identify and troubleshoot network events that clients typically encounter when associating with an AP, authenticating, and accessing the network. Intelligent automation triggers dynamic packet capture (PCAP) to collect salient data used for root cause analysis, and to suggest remediation.

ExtremeCloud IQ includes advanced capabilities to simplify and enhance daily operations. Updated Wi-Fi maps display real-time radio frequency (RF) and responsive views at scale. Users can visualize active channel plans on all three bands: 2.4 gigahertz (GHz) Wi-Fi and Bluetooth Low Energy (BLE), plus 5 and 6 GHz Wi-Fi. It includes a scaling tool with definable wall types, custom attenuation values, an AP expandible device modal, and client information modals.

Templates for APs enable rapid deployment, with most of the port settings already applied by the associated template. The ExtremeCloud IQ Companion mobile app, for Android and iOS, helps simplify the provisioning and configuration of devices and creates a full installation report. This allows users to monitor and access details about the network from any location in near real time, and it includes a comprehensive troubleshooting toolbox.

Wi-Fi 7 (802.11be) Technology

Wi-Fi 7 (802.11be) introduces benefits across the 2.4 GHz, 5 GHz, and 6 GHz bands with reduced latency and jitter for time-sensitive networking applications. Wi-Fi 7 capabilities such as 320 MHz channels, 4K-QAM, and Multi-Link Operation (MLO) helps enable superior speeds and high-density performance. The 6 GHz band enables improved quality of service (QoS) in dense environments, new applications and use cases, and an improved user experience.

* Country dependent

Universal Hardware

The AP4020 is built with Extreme's Universal Hardware technology that allows multiple deployment use cases through a simple change of the software or feature set. Universal hardware platforms increase flexibility and reduce obsolescence by allowing customers to gradually adopt new technologies without the need for a rip and replace approach to their hardware.

Offered with a Universal World SKU AP, the AP4020 allows customers, partners, and distributors to order one model for any region where Extreme Networks products are sold, replacing the age-old problem of country-specific models.

Software-Defined Radios

The Wi-Fi 7 AP4020 features two distinct software defined radio (SDR) modes for different deployment scenarios. Dual 5 GHz supports high-density deployments with a dedicated sensor. The AP4020 is a quad radio AP that can transmit with multiple combinations of three data radios across the 2.4 GHz, 5 GHz, and 6 GHz bands in addition to an always-on dedicated tri-frequency sensor. The AP4020 intelligently monitors the software-configurable radios, enabling network managers to configure network RF technology based on the user environment and to configure the APs in different modes as required. The AP4020 features superior tri-frequency radio performance with a multiband filter that reduces interference and enables 5 GHz and 6 GHz operation across all available channels without restrictions.

Security

The AP4020 delivers the highest level of security services, beginning with support for the latest Wi-Fi Alliance WPA3 security certifications. The AP4020 also acts as an enforcement point for ExtremeCloud Universal ZTNA – the industry's most complete network access security solution. Universal ZTNA provides automated security policy enforcement and manages SSIDs to enforce policies on the AP4020. Extreme Fabric adds additional security by automating provisioning and deployment by connecting to a Fabric -enabled switch. Additionally, the AP supports a stateful L2-L7 DPI firewall for context-based access security, tri-frequency security, an location analytics sensor, and much more. The AP4020 also includes a unique dedicated security sensor for rich insights and threat detection when paired with Extreme AirDefense.

Modern IoT Platform

To support both IoT and guest engagement services, the AP4020 integrates Bluetooth® to connect with IoT devices wirelessly and to engage loyal customers with Apple iBeacon. Enterprises can use API-driven applications to send advertisements directly to shoppers, guests, and conference attendees. This makes it ideal for businesses to advertise their app, download pages, captive portals, or site-specific information. The AP4020 features dual IoT radios, enabling multiple concurrent IoT use cases and eliminates the need for an overlay infrastructure with improved performance and reduced complexity of multiple wireless networks.

Product Specifications

Radio Specifications

Max Users

SSID per Radio/Total: 16/48

Users per Radio/total: 512/1536

802.11a

5.150 GHz–5.850 GHz Operating Frequency

Orthogonal Frequency Division Multiplexing (OFDM) Modulation

Rates (Mbps): 54, 48, 36, 24, 18, 12, 9, 6 w/auto fallback

802.11b

2.4 GHz–2.5 GHz Operating Frequency

Direct-Sequence Spread-Spectrum (DSSS) Modulation

Rates (Mbps): 11, 5.5, 2, 1 w/auto fallback

802.11g

2.4 GHz–2.5 GHz Operating Frequency

Orthogonal Frequency Division Multiplexing (OFDM) Modulation

Rates (Mbps): 54, 48, 36, 24, 18, 12, 9, 6 w/auto fallback

802.11n

2.4 GHz–2.5 GHz and 5.150–5.850 GHz Operating Frequency

802.11n Modulation

HT20 High-Throughput (HT) Support (for both 2.4 GHz and 5 GHz)

HT40 High-Throughput (HT) Support for 5 GHz

A-MPDU and A-MSDU Frame Aggregation

Rates (Mbps): MCS0 – MCS31 (6.5MBps - 600Mbps)

802.11ac

5.150 GHz–5.850 GHz Operating Frequency

802.11ac Modulation (256-QAM)

5G: 2x2 Multiple-In, Multiple-Out (MIMO) Radio

2.4G: 2x2 Multiple-In, Multiple-Out (MIMO) Radio

Rates (Mbps): MCS0–MCS9 (6.5Mbps), 1733Mbps, NSS = 1-2.

2x2:2 Stream Multiple-In, Multiple-Out (MIMO) Radio

VHT20/VHT40/VHT80/VHT160

TxBF (Transmit Beamforming)

802.11ax

2.4 GHz-2.5GHz, 5.50 GHz-5.850 GHz and 5.925 GHz-7.125 GHz Operating Frequencies

802.11ax Modulation (1024-QAM)

Dual-band OFDMA

Rates (Mbps):

• 6G Rate: HE0-HE11 (8 Mbps – 4800 Mbps)

• 5G Rate : HE0-HE11 (8 Mbps – 4800 Mbps)

• 2.4G Rate: HE0-HE11 (8Mbps – 1148 Mbps)

2x2:2 Stream Multiple-In, Multiple-Out (MIMO) Radio at 6 GHz

2x2:2 Stream Multiple-In, Multiple-Out (MIMO) Radio at 5 GHz

2x2:2 Stream Multiple-In, Multiple-Out (MIMO) Radio at 2.4 GHz

HE20/HE40/HE80/HE160/HE320 support for 6 GHz

HE20/HE40/HE80/HE160 support for 5 GHz

HE20/HE40 support for 2.4 GHz

UL/DL SU-MIMO and MU-MIMO

TxBF (Transmit Beamforming)

802.11be

2.4 GHz–2.5GHz, 5.15 GHz–5.850 GHz, and 5.925 GHz–7.125 GHz Operating Frequencies

802.11be modulation (4096-QAM)

Rates (Mbps):

• 6G: EHT0-EHT13 (8Mbps–5,765 Mbps)

• 5G: EHT0-EHT13 (8Mbps–2,882 Mbps)

• 2.4G: EHT0-EHT13 (8Mbps–688 Mbps)

2x2:2 stream MIMO radio at 6 GHz

2x2:2 stream MIMO radio at 5 GHz

2x2:2 stream MIMO radio at 2.4 GHz

EHT20/EHT40/EHT80/EHT160/EHT320 support for 6 GHz

EHT20/EHT40/EHT80/EHT160 support for 5 GHz

EHT20/EHT40 support for 2.4 GHz

UL/DL SU-MIMO and MU-MIMO

TxBF (transmit beamforming)

Dual IoT Radios

(2) radios for Thread, Zigbee®, Bluetooth 5.4 Low Energy, IEEE 802.15.4 Thread

Interfaces

Eth0, Eth1: (2) wired Ethernet ports (RJ45)

100/1,000/2,500/5,000Mbps autosensing link speed Ethernet port, PoE PD

802.3az Energy-Efficient Ethernet (EEE)

USB 2.0, Type A, 5V/500mA with POE 802.3at or 5V/1,000mA with PoE 802.3bt

Power Options

Power Draw: 802.3at PoE: Typical 21W with USB 2.5W; Max: 25.5W 2.5W USB

Power Draw: 802.3bt: Max: 28W with 5W USB

12V DC/3A. DC power has priority when both DC and PoE power sources are available

PoE Failover

Physical Specifications

Dimensions: 9.46 in. x 9.46 in. x 1.48 in. (240.3 mm x 240.3 mm x 37 mm)

Weight: 2.9 lbs (1.3 kg)

Security

Kensington lock slot

Trusted Platform Module (TPM)

Internal Antennas

(2) dual band 2.4 GHz and 5 GHz
(2) single band 5 GHz
(2) single band 6 GHz
(1) 2 GHz/5 GHz/6 GHz sensor
(3) IoT sensor

Mounting

AP support 15/16 in. flush ceiling tile included in the box
Wall mount included in the box or sold as an accessory
Sculpted ceiling tile 15/16 in. wide t-bar sold as an accessory
Sculpted ceiling tile 9/16 in. wide t-bar sold as an accessory
Beam sold as an accessory
Junction box sold as an accessory
IL or 9/16 in. t-bar sold as an accessory
SL (Silhouette) sold as an accessory
WiNG main plate adaptor sold as an accessory
Built-in slot for Kensington

Environmental Specifications

Operating: 0°C to 50°C (32°F to 122°F)
Storage: 0°C to 70°C (32°F to 158°F)
Humidity: 0% to 95% (non-condensing)

Environmental Compliance

EU RoHS – 2011/65/EU and Amendments(EU) 2015/863
EU WEEE – 2012/19/EU
EU REACH - Regulation (EC) No 1907/2006 – Reporting
EU SCIP – EU Waste Framework Directive
China RoHS – 2 SJ/T 11364-2014
Taiwan RoHS CNS 15663 (2013.7)

Regulatory Compliance

Radio Standards USA

Part 15C - 15.247
Part 15E - 15.407
RF exposure - FCC Part 1.1307

Radio Standards Canada

RSS 247 for 2.4G & 5GHz
RSS 248 6GHz RLAN
RF exposure - RSS-102: Issue 5, 2015

Radio Standards CE

2014/53/EU Radio Equipment Directive
EN 300 328, EN 301 893, EN 302 502, EN 300 440
EN301 489 1, EN 301 489 17, EN 62311, EN 62479

Regulatory and Safety

North American ITE

UL 60950-1 2nd edition Listed device (U.S.)
CSA 22.2 No. 60950-1 2nd edition 2014 (Canada)
UL/CuL 62368-1 Listed
UL 2043 Plenum rated

European ITE

EN 62368-1
2014/35/EU Low Voltage Directive

International ITE

CB IEC 62368-1 2nd Edition + National Differences
CB IEC 62368-1 1st and 3rd Editions + National Differences
AS/NZS 60950-1 (Australia /New Zealand)

EMI/EMC Standards

North American EMC Standards

FCC CFR 47 part 15 Class B (USA)
ICES-003 Class B (Canada)

European EMC Standards

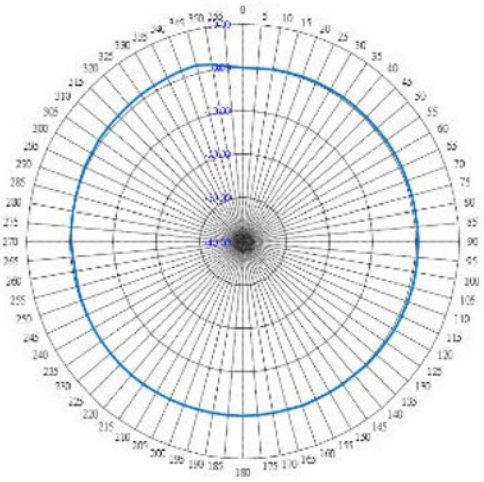
EN 55032 Class B
EN 55024
EN 55035
EN 55011, EN 60601-1-2
EN 61000-3-2: (Harmonics)
EN 61000-3-3 (Flicker)
2014/30/EU EMC Directive

International EMC Certifications

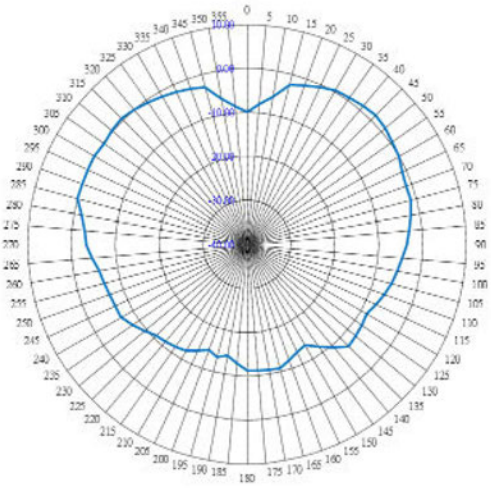
CISPR 32 Class B (International Emissions)
AS/NZS CISPR 32
CISPR 24/CISPR 35 (International Immunity)

Radiation Patterns – 5G Low Azimuth and Elevation

5G Low Horizontal

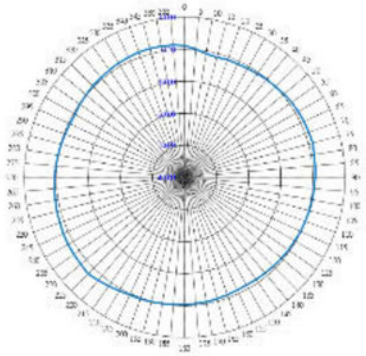


5G Low Vertical

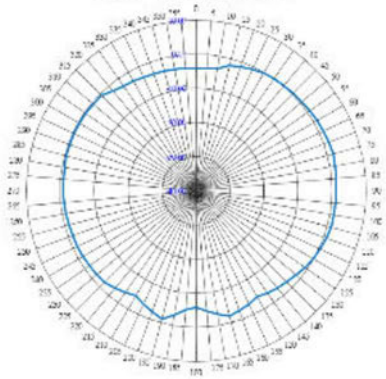


Radiation Patterns – 2G, 5G, and 6G Azimuth and Elevation

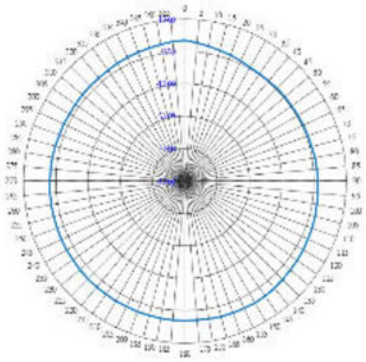
2G Horizontal



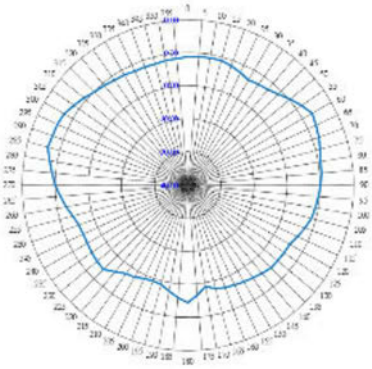
2G Vertical



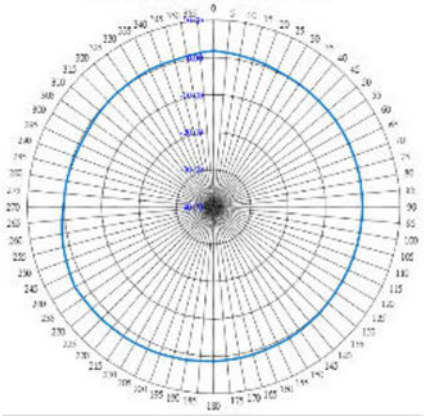
5G Horizontal



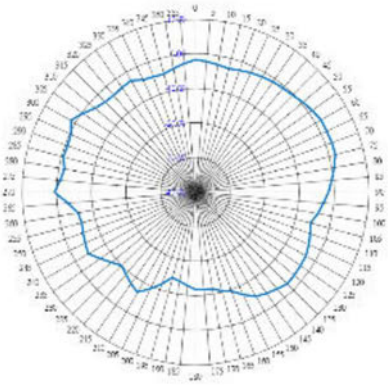
5G Vertical



6G Horizontal

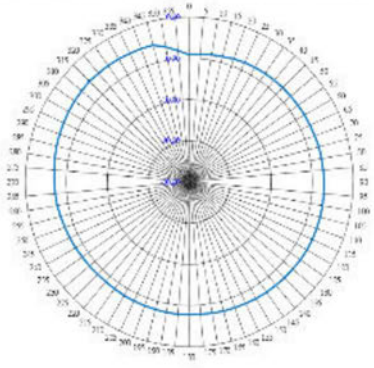


6G Vertical

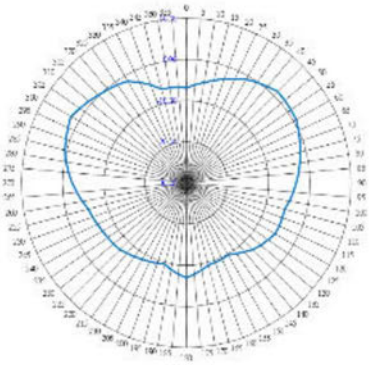


Radiation Patterns – Sesnor 2G, 5G, and 6G Azimuth and Elevation

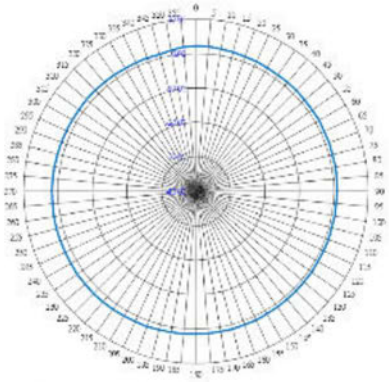
Sensor 2G **Horizontal**



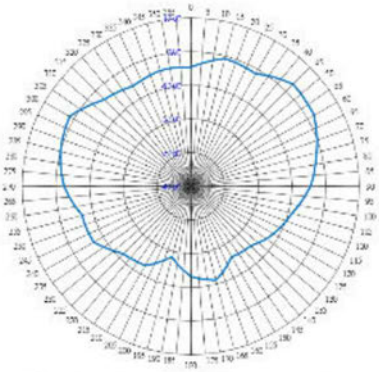
Sensor 2G **Vertical**



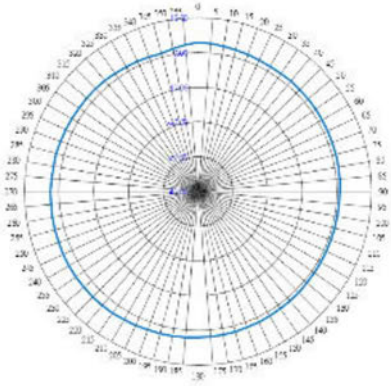
Sensor 5G **Horizontal**



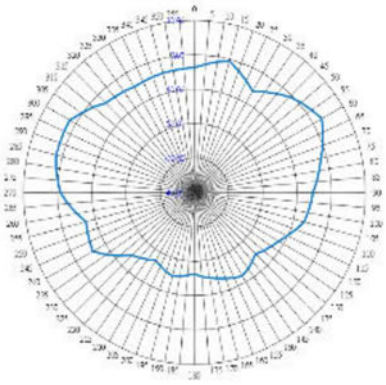
Sensor 5G **Vertical**



Sensor 6G **Horizontal**

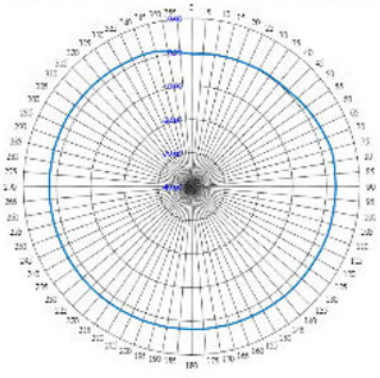


Sensor 6G **Vertical**

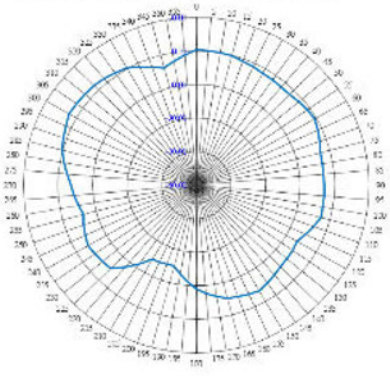


Radiation Patterns – BLE Radio 1 and Radio 2 Azimuth and Elevation

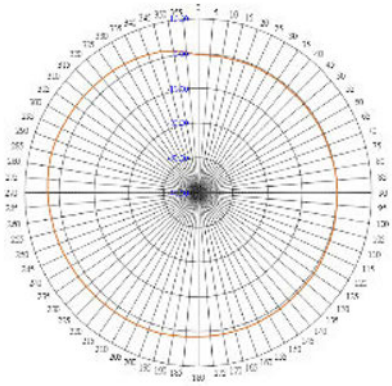
BLE Radio 1 Horizontal



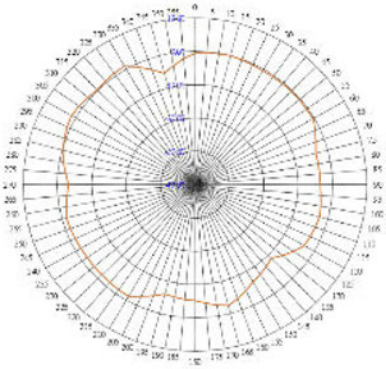
BLE Radio 1 Vertical



BLE Radio 2 **Horizontal**



BLE Radio 2 **Vertical**



Ordering Information

AP4020 Series - SKUs

Part number	Description
AP4020-WW	Indoor Quad Radio Wi-Fi 7 (2x2:2): 2.4GHz, 5GHz, 6GHz and dedicated sensor, Multi-Rate Port, internal antennas. T-Bar, Incl Mt (AH-ACC-BKT-AX-TB). Domain: World SKU
AP4020-WW-TAA	Indoor Quad Radio Wi-Fi 7 (2x2:2): 2.4GHz, 5GHz, 6GHz and dedicated sensor, Multi-Rate Port, internal antennas. T-Bar, Incl Mt (AH-ACC-BKT-AX-TB). Domain: World SKU TAA Compliant

Mounting accessories

Part number	Indoor AP mounting	Notes
AH-ACC-BKT-AX-TB	Mounting bracket for Prelude 15/16" and Suprafine 9/16" ceilings and walls	Ships with AP4020/X/FX box Can be used for wall - 0.25"
AH-ACC-BKT-AX-WL	Mounting bracket for direct-to-wall installations	Can be used for wall - 1.25"
AH-ACC-BKT-AX-IL	Mounting bracket for interlude ceilings	
AH-ACC-BKT-AX-SL	Mounting bracket for Armstrong 1/8" and 1/4" main beam Silhouette reveal ceiling grids	Up to 0.33" ceiling tile protrusion
ACC-BKT-AX-JB	Junction box or wall mounting for indoor APs	Gang/junction box
ACC-BKT-AX-BEAM	Beam mounting for indoor APs	Up to 0.78" thick beam
AH-ACC-BKT-916-KIT	9/16" ceiling mount brackets for non-flat/protruded ceiling tiles - use with AH-ACC-BKT-AX-TB	9/16" non-flat/protruded ceiling tiles
ACC-BKT-TB-NF	Adapter bracket AH-ACC-BKT-TB for 15/16" wide t-bars non-flat/protruded ceiling tiles	5/16" wide t-bars non-flat/protruded ceiling tiles
ACC-BKT-AX-WNGADAPT	Adapter backet for cloud AP to wing mounting plate (#37201). 10 pack.	Allow twist mount to mount to legacy mounts

Power accessories

Part number	Description
37219	PWR adapter 12V DC, 3A, 2.5 mm x 5.5 mm connector

Other accessories

Part number	Description
ACC-WIFI-MICRO-USB	Micro-USB to USB console adapter cable for Extreme wireless APs

See Product Installation Guide for more details.

Disclaimer

Specifications described in this document are preliminary and subject to change. Extreme Networks reserves the right to modify the specifications in this document without notice. Please check with your Extreme Networks point of contact for the most up to date information.

Warranty

The AP4020 is covered under Extreme's Universal LLW policy. For warranty details, visit: http://www.extremenetworks.com/support/policies

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Extreme networks

Data Sheet

Universal Wireless AP460C

Highlights

Advanced Radio Technology

Tri-Radio Design

- 5 GHz 4x4:4
- 2.4 GHz 2x2:2
- 2.4 GHz/5 GHz/Sensor

Multiple Radio Modes - SSR

- 2.4 GHz/5 GHz/Sensor (2.4 GHz/5GHz)
- 5 GHz/5 GHz - Dual 5 GHz

Universal Hardware Platform

- On-Premise: WiNG OS -Centralized and Distributed
- Cloud: IQ Engine

High Density Environments

- Delivers exceptional end-user experience even in the densest user environments

WPA3 Support

- Includes the latest WPA3 Wi-Fi security standard delivering robust protections for users and IoT devices

Fully Functional over 802.3at

Designed for Harsh Environments

- IP67 Outdoor Rated
- Extended temp range- 40C to +60C

Smart Management Choices

- ExtremeCloud™ IQ for powerful, simple, and secure public or private cloud management
- ExtremeCloud™ IQ Controller or VX/NX controllers ideal for for on-premises requirements
- Optional ExtremeCloud™ IQ visibility supported via on-premises controller



Wi-Fi 6 (802.11ax) Tri-Radio Outdoor Access

In today's world, as businesses make capital investments in their technology infrastructure, they must have a keen eye on how those investments can improve operational efficiency and reduce cost. With Extreme's Universal infrastructure, customers can take advantage of hardware agility and reduce the total cost of their network by adopting platforms that allow them to run multiple Extreme operating systems. This multi-persona capability provides increased product flexibility and reduced hardware obsolescence.

The AP460C is part of Extreme's Universal Wi-Fi platforms and provides users the choice of Wi-Fi operating system (IQ Engine or WiNG Operating System). Customers have the flexibility to select the OS at start-up or at a later stage and the AP will assume the features/capabilities of the selected OS. When first booted, the AP460C automatically connects to ExtremeCloud IQ to find its persona. The pre-provisioned OS persona is then remotely enabled on the AP460C AP and the user can stay in the cloud or select manage the device locally.

The AP460C is a Tri Radio based on advanced radio technology delivers 802.11ax and is designed for harsh environments; from hurricane force winds to sub-zero temperature. The AP460C is IP67 outdoor rated and extends Extreme's Wi-Fi 6 coverage outdoors in a sleek form factor with three different antenna models: AP460C is based on internal Omni antenna, AP460S6C is a internal 60° Sector, and the AP460S12C is based on a 120° Sector for the most challenging outdoor deployments.

The AP460C is based on Wi-Fi 6 Tri-Radios design delivers 802.11ax 2x2:2 data rates on 2.4 GHz and 4x4:4 data rates on 5 GHz concurrently on both the 2.4 GHz and 5 GHz radios and a 3rd radio for a dedicated full time dual banded sensor. The Tri-Radio APs continue the Extreme tradition of software-selectable-

radios (SSRs) capable of dual 5 GHz connectivity for outdoor harsh environments. The AP460C platforms are the first generation of APs to run multiple Extreme operating systems, providing flexibility and choice of on-premise or cloud deployment, while minimizing total cost of ownershipWith more users, more devices, more things, more applications and more threats straining the infrastructure, the AP460C was engineered to meet those challenges. The AP460C combines powerful 802.11ax Wi-Fi 6 technology, advanced security and ML/AI management capabilities together into an enterprise class solution that allows you to deploy high speed, highly secure Wi-Fi into the toughest environments.



Security

The AP460C delivers the highest level of security services, beginning with support for the latest Wi-Fi Alliance WPA3 security certifications. Additionally, supporting a stateful L2-L7 DPI firewall for context-based access security.



Wi-Fi 6 Technology

Prior generations of 802.11n, 802.11ac wave 1 and 2, can be considered generational improvements with an emphasis on faster speed. 802.11ax technology instead enhances Wi-Fi efficiency as well as speed, taking Wi-Fi networks to an entirely new level. To learn more about 802.11ax, go to: https://www.extremenetworks.com/are-you-ready-for-802-11ax/



Universal Hardware

The AP460C as a universal hardware platform comes with a dual-persona capability allowing user choice of the Wi-Fi operating system (OS). Either the IQ Engine operating system or the WiNG Operating System persona can be enabled as required. The desired persona can be selected at start-up or changed at a later stage. Once selected, the AP460C assumes the features/capabilities of the selected OS. When first booted, the AP460C automatically connects to ExtremeCloud IQ to find its persona. The pre-provisioned OS persona is then remotely enabled on the AP460C system, eliminating the need for manual selection.



Management Analytics

In conjunction with management system, cloud or On-premises the AP460C provides a very rich set of data displayed via context driven widgets, representing historical data or a combination of historical and current data. This provides context-specific granularity with perspective views for locations, network, APs, individual client devices as well as policy roles. In each context, administrators can adjust dashboards from widget library.



Programmable Radios

Industry's first tri-radio 802.11ax access point with two software selectable radios to optimally manage radios to provide the highest level of client performance while simultaneously providing continuous RF monitoring for security threats. The AP460C intelligent monitoring of the software selectable radios enables network managers configure network RF topology based on user environment and configure the access points in different modes as required.



Integrated BLE

To support both IoT and Guest Engagement services the AP460C integrates Bluetooth to connect with IoT devices with Thread wireless or engage loyalty customers with Apple iBeacon. Enterprises can use API driven applications to send advertisements directly to shoppers, guests, and conference attendees. This makes it ideal for businesses to advertise their app-download pages, captive portals, or site-specific information.

Product Specifications

Radio Specifications

Max Users

- SSID per Radio/Total: 8/16
- Users per Radio/total: 512/1024

802.11a

- 5.150–5.850 GHz Operating Frequency
- Orthogonal Frequency Division Multiplexing (OFDM) Modulation
- Rates (Mbps): 54, 48, 36, 24, 18, 12, 9, 6 w/auto fallback

802.11b

- 2.4–2.5 GHz Operating Frequency
- Direct-Sequence Spread-Spectrum (DSSS) Modulation
- Rates (Mbps): 11, 5.5, 2, 1 w/auto fallback

802.11g

- 2.4–2.5 GHz Operating Frequency
- Orthogonal Frequency Division Multiplexing (OFDM) Modulation
- Rates (Mbps): 54, 48, 36, 24, 18, 12, 9, 6 w/auto fallback

802.11n

- 2.4–2.5 GHz and 5.150–5.850 GHz Operating Frequency
- 802.11n Modulation
- Rates (Mbps): MCS0 – MCS31 (6.5MBps - 600Mbps)
  - 5G: 4x4 Multiple-In, Multiple-Out (MIMO) Radio
  - 2.4G: 2x2 Multiple-In, Multiple-Out (MIMO) Radio
- HT20 High-Throughput (HT) Support (for both 2.4 GHz and 5 GHz)
- HT40 High-Throughput (HT) Support for 5 GHz
- A-MPDU and A-MSDU Frame Aggregation

802.11ac

- 5.150–5.850 GHz Operating Frequency
- 802.11ac Modulation (256-QAM)
- Rates (Mbps): MCS0–MCS9 (6.5Mbps – 3467Mbps), NSS = 1-4.
- 2x2:2 Stream Multiple-In, Multiple-Out (MIMO) Radio
- VHT20/VHT40/VHT80 support
- TxBF (Transmit Beamforming)

802.11ax (for 5 GHz Sensor)

- 5.150–5.850 GHz Operating Frequency
- 802.11ax Modulation (1024-QAM)
- Dual-band OFDMA
- Rates (Mbps): HE0-HE11 (8 Mbps – 1200 Mbps), NSS = 1-2.
- 2x2:2 Stream Multiple-In, Multiple-Out (MIMO) Radio
- VHT20/VHT40/VHT80/VHT160 support
- TxBF (Transmit Beamforming)

802.11ax (for 5 GHz Radio)

- 2.4–2.5 GHz and 5.150–5.850 GHz Operating Frequency
- 802.11ax Modulation (1024-QAM)
- Dual-band OFDMA
- Rates (Mbps):
  - 5G: HE0-HE11 (8 Mbps – 4800 Mbps)
  - 2.4G: HE0-HE11 (8Mbps – 574 Mbps)
- 4x4:4 Stream Multiple-In, Multiple-Out (MIMO) Radio
- HE20/HE40/HE80/HE160 support for 5 GHz
- HE20/HE40 support for 2.4 GHz
- DL SU-MIMO and MU-MIMO
- TxBF (Transmit Beamforming)

Radios

- BLE 5 Radio Bluetooth® Low Energy
- USB 2.0, Type A , 5V, .5A

Interfaces

- 100/1000/2500 Mbps auto-negotiation Ethernet port, RJ45 PoE (Power over Ethernet 802.3at) Port
- 10/100/1000 Mbps auto-negotiation Ethernet port, RJ45

Power Specifications

- IEEE 802.3at PoE Power

Physical:

- AP460C: 9.4" x 9.4" x 2.9" (237.6 mm x 237.6 mm x 72.5 mm)
  Weight: 3.9 lbs (1.8 kg)
- AP460S6C: 9.4" x 9.4" x 3.5" (237.6 mm x 237.6 mm x 90mm)
  Weight: 4 lbs (1.8 kg)
- AP460S12C: 9.4" x 9.4" x 3.5" (237.6 mm x 237.6 mm x 90mm)
  Weight: 4 lbs (1.8 kg)

Power Options

- Power Draw: Typical 21.7W, Max: 25.3W (w/USB)
  Typical 18.2W, Max 20.8W (w/o USB)
- 802.3at Power over Ethernet (PoE) capable Gigabit Ethernet port (RJ-45 power input pins: Wires 4,5,7,8 or 1,2,3,6)
- 802.3af Power over Ethernet injector

Antennas

AP460C - Internal OMNI Antennas

- (2) Integrated single band, 5.1-5.8 GHz omnidirectional antennas
- (4) Integrated dual band, 2.4-2.5 GHz and 5.1-5.8 GHz omnidirectional
- (1) Integrated single band, 2.4-2.5 GHz omnidirectional antennas for BLE

AP460S6C - Internal 60° Sector. Antennas

- (2) Integrated single band, 5.1-5.8 GHz sector antennas
- (4) Integrated dual band, 2.4-2.5 GHz and 5.1-5.8 GHz sector antennas
- (1) Integrated single band, 2.4-2.5 GHz omnidirectional antennas for BLE

AP460S12C - Internal 120° Sector. Antennas

- (2) Integrated single band, 5.1-5.8 GHz sector antennas
- (4) Integrated dual band, 2.4-2.5 GHz and 5.1-5.8 GHz sector antennas
- (1) Integrated single band, 2.4-2.5 GHz omnidirectional antennas for BLE

Environmental

- Operating: -40 to 60°C
- Storage: -40 to 70°C
- Humidity: 0% to 95% (non-condensing)

Environmental Discharge

- +/- 8KV contact and +/- 15 KV air

Environmental Compliance

- Housing: IP67 rated outdoor use

Regulatory Compliance

Product Safety Certifications

- IEC 60950-1, EN 60950-1, UL 60950-1, CSA 22.2 No.60950-1-03 AS/NZS 60950.1,
- RoHS Directive 2011/65/EU

Radio Approvals

- FCC CFR 47 Part 15, Class B, ICES-003 Class B, FCC Subpart C 15.247, FCC Subpart E 15.407, RSS247, EN 301 893, EN 300 328, EN 301 489 1 and 17, EN 50385, EN 55032 (CISPR 32), EN 60601-1-2,
- AS/NZS4268 + CISPR32

Wi-FI Alliance Certifications

Wi-Fi Alliance Certifications	
Connectivity	Wi-Fi CERTIFIED 6™ Wi-Fi CERTIFIED™ a, b, g, n, ac
Access	Passpoint®
Optimization	WMM® WMM® – Power Save Wi-Fi Agile Multiband™
Security	Protected Management Frames WPA™ – Enterprise, Personal WPA2™ – Enterprise, Personal WPA3™ – Enterprise, Person

Peak Antenna Gain

AP460C Max Antenna Gain (Integrated Antenna)

Software Mode	WiFi 0	WiFi 1	WiFi 2	IoT Radio	Azimuth Beamwidth	Elevation Beamwidth
Dual Band	2.4 Ghz 3.24dBi	5 Ghz 4.21dBi	2.4 Ghz 3.74dBi/ 5 Ghz 3.42dBi	3.2dBi	360	150
Dual 5G	5 Ghz 3.56dBi	5 Ghz 4.21dBi	2.4 Ghz 3.74dBi 5 Ghz 3.42dBi	3.2dBi	360	150

AP460S6C Max Antenna Gain (Integrated Antenna)

Software Mode	WiFi 0	WiFi 1	WiFi 2	IoT Radio	Azimuth Beamwidth	Elevation Beamwidth
Dual Band	2.4 Ghz 7.83dBi	5 Ghz 8.06dBi	2.4 Ghz 7.59dBi/ 5 Ghz 7.63dBi	7.9dBi	60	60
Dual 5G	5 Ghz 7.83dBi	5Ghz 8.06dBi	2.4 Ghz 7.59dBi/ 5 Ghz 7.63dBi	7.9dBi	60	60

AP460S12C Max Antenna Gain (Integrated Antenna)

Software Mode	WiFi 0	WiFi 1	WiFi 2	IoT Radio	Azimuth Beamwidth	Elevation Beamwidth
Dual Band	2.4 Ghz 6.46dBi	5 Ghz 6.25dBi	2.4 Ghz 5.53dBi/ 5 Ghz 5.54dBi	6.63dBi	120	70
Dual 5G	5 Ghz 6.34dBi	5Ghz 6.25dBi	2.4 Ghz 5.53dBi/ 5 Ghz 5.54dBi	6.63dBi	120	70

Power and Receive Sensitivity - 2.4 GHz

Channel	Data Rate	Power (dBm)	Sensitivity
11b	1 - 11 Mbps	18, 16	-93, -87
11g	6 Mbps	18	-89
	54 Mbps	15	-72
11n HT20	MCS0, 7	18, 14	-89, -70
11n HT40	MCS0, 7	18, 14	-86, -68
11ax HE20	HE0, 11	18, 11	-89, -59
11ax HE40	HE0, 11	18, 11	-86, -56

Power and Receive Sensitivity – 5 GHz (High band)

Channel	Data Rate	Power (dBm)	Sensitivity
11a	6 Mbps	20	-89
	54 Mbps	17	-72
11n HT20	MCS0, 7	20, 16	-89, -70
11n HT40	MCS0, 7	19, 16	-86, -68
11ac VHT20	MCS0, 8	20, 15	-89, -66
11ac VHT40	MCS0, 9	19, 15	-86, -61
11ac VHT80	MCS0, 9	18, 15	-84, -54
11ac VHT160	MCS0, 9	17, 14	-78, -49
11ax HE20	HE0, 11	20, 15	-89, -59
11ax HE40	HE0, 11	19, 15	-86, -56
11ax HE80	HE0, 11	18, 15	-84, -53
11ax HE160	HE0, 11	17, 14	-78, -47

Power and Receive Sensitivity – 5 GHz (Full Band)

Channel	Data Rate	Power (dBm)	Sensitivity
11a	6 Mbps	21	-90
	54 Mbps	18	-73
11n HT20	MCS0, 7	21, 17	-90, -71
11n HT40	MCS0, 7	20, 17	-87, -69
11ac VHT20	MCS0, 8	21, 16	-90, -67
11ac VHT40	MCS0, 9	20, 16	-87, -62
11ac VHT80	MCS0, 9	19, 16	-85, -55
11ac VHT160	MCS0, 9	18, 15	-79, -50
11ax HE20	HE0, 11	21, 16	-90, -60
11ax HE40	HE0, 11	20, 16	-87, -57
11ax HE80	HE0, 11	19, 16	-85, -54
11ax HE160	HE0, 11	18, 15	-79, -48

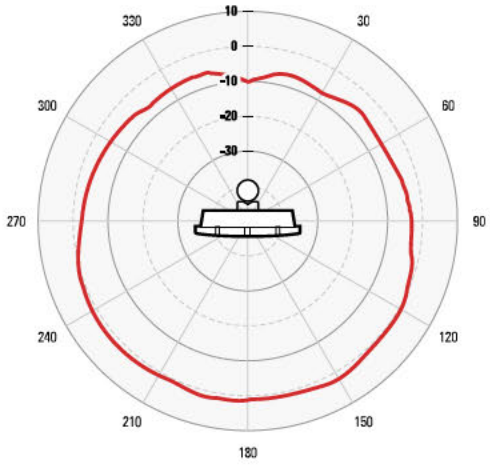
Power and Receive Sensitivity – 5 GHz (Low Band)

Channel	Data Rate	Power (dBm)	Sensitivity
11a	6 Mbps	18	-89
	54 Mbps	16	-72
11n HT20	MCS0, 7	18, 15	-89, -70
11n HT40	MCS0, 7	18, 15	-86, -68
11ac VHT20	MCS0, 8	18, 14	-89, -66
11ac VHT40	MCS0, 9	18, 14	-86, -61
11ac VHT80	MCS0, 9	18, 14	-84, -54
11ax HE20	HE0, 11	18, 13	-89, -59
11ax HE40	HE0, 11	18, 13	-86, -56
11ax HE80	HE0, 11	18, 13	-84, -53

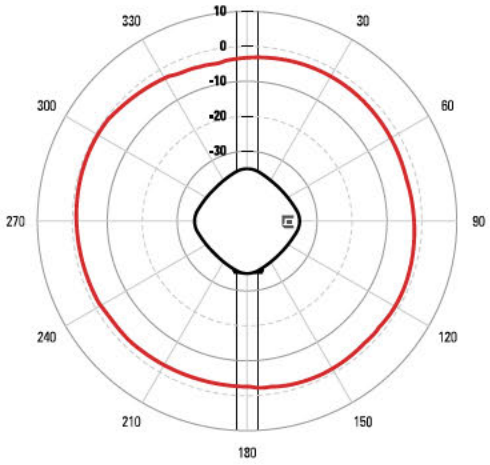
Maximum EIRP may vary based upon deployed country

AP460C — Radiation Patterns

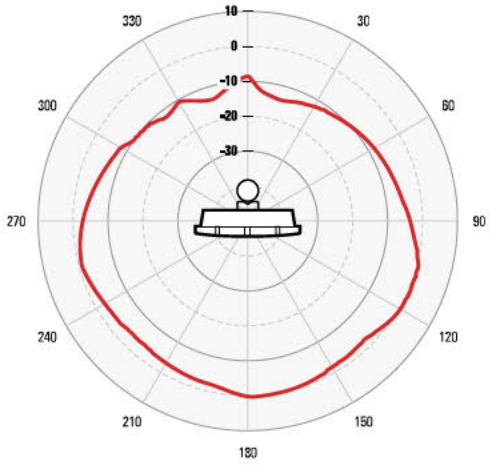
RADIO 0 AZIMUTH — 2.4 GHZ



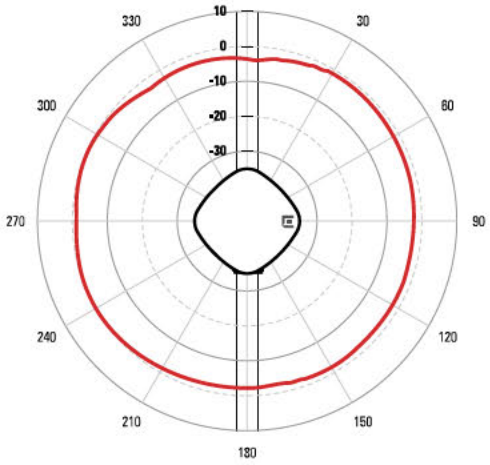
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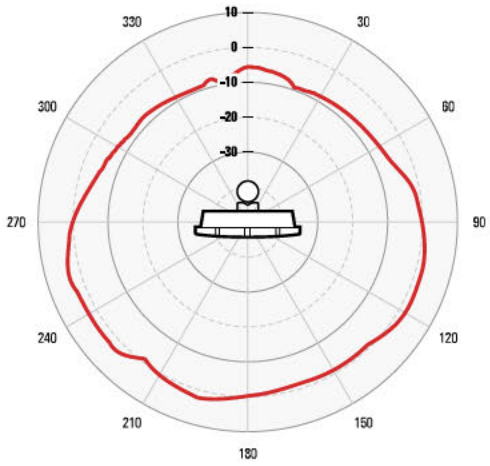
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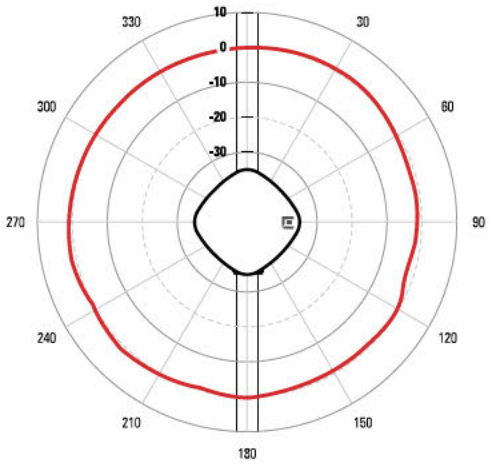
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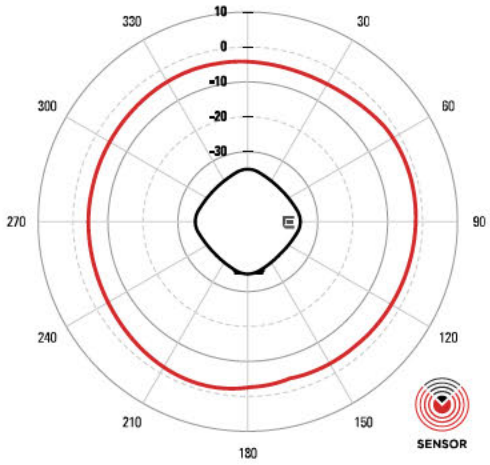


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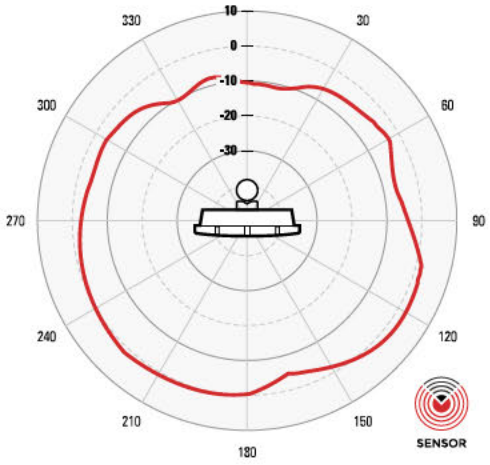


AP460C — Sensor Patterns

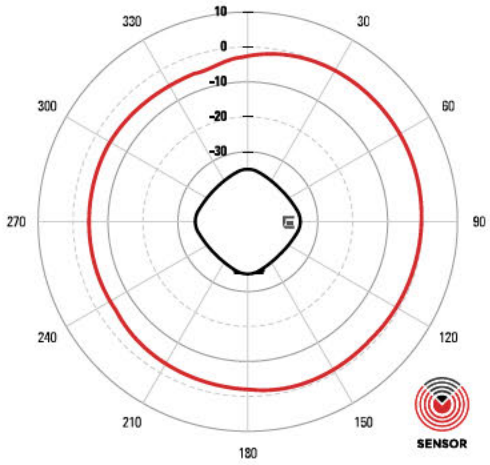
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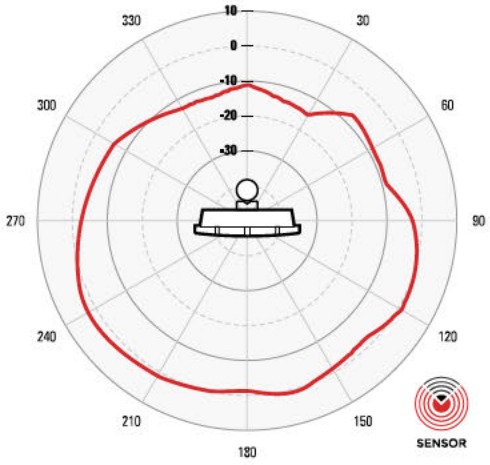
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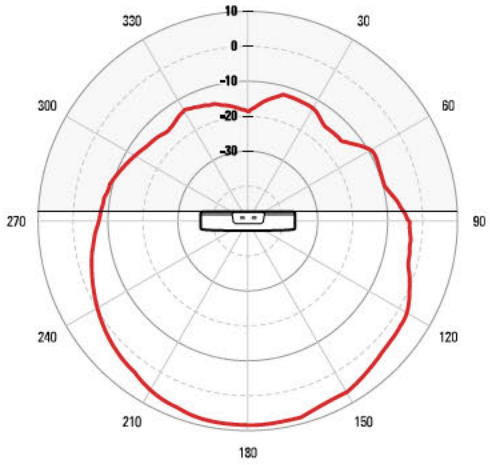


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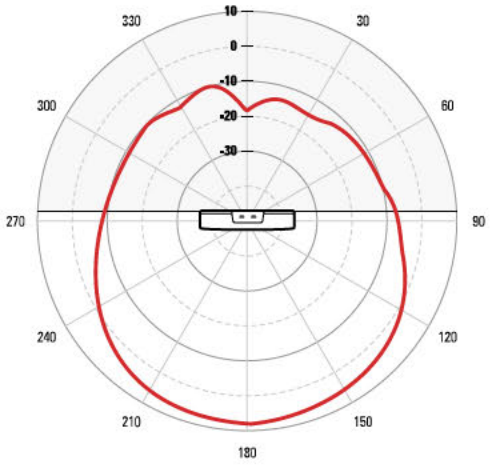


AP460S6C — Radiation Patterns

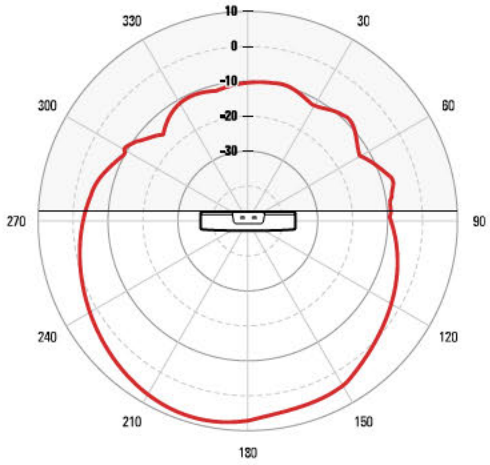
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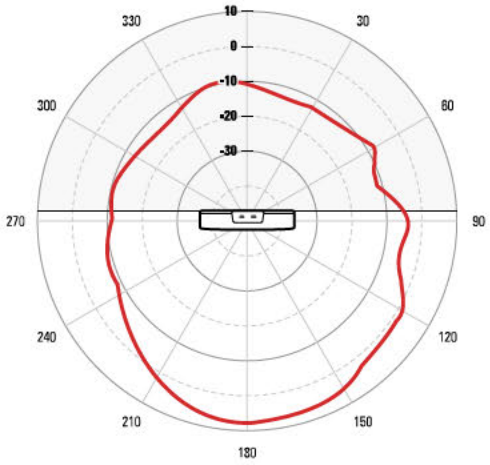
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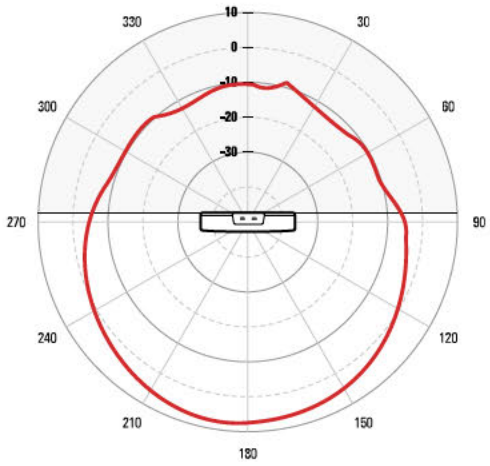
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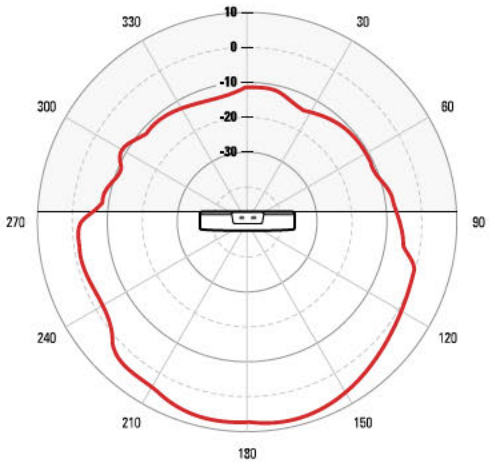
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RADIO 1 AZIMUTH — 5 GHZ

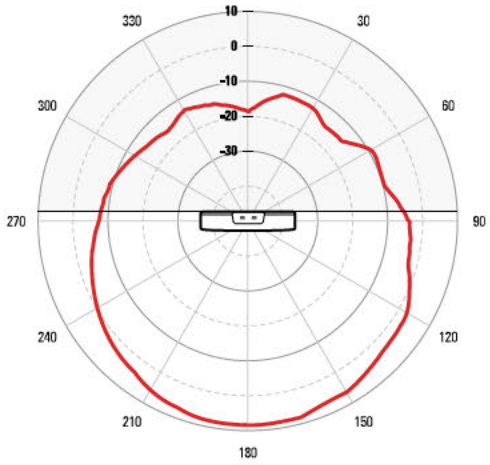


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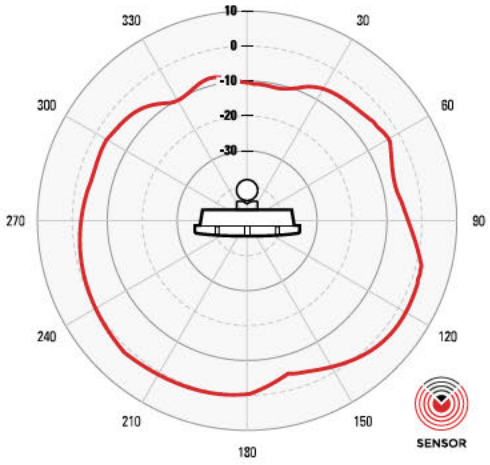


AP460S6C — Sensor Patterns

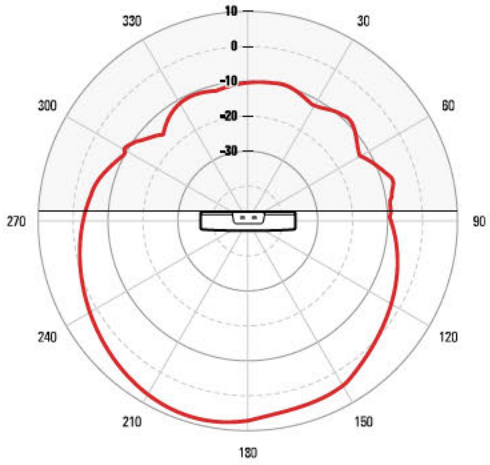
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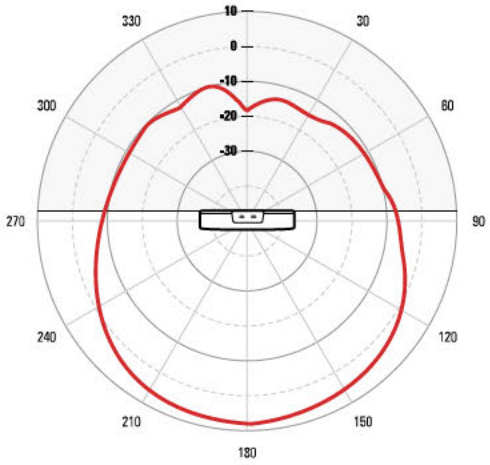
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RADIO 0 AZIMUTH — 5 GHZ

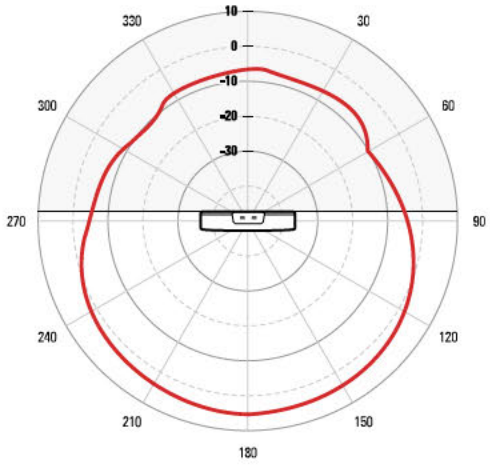


RADIO 0 ELEVATION — 5 GHZ

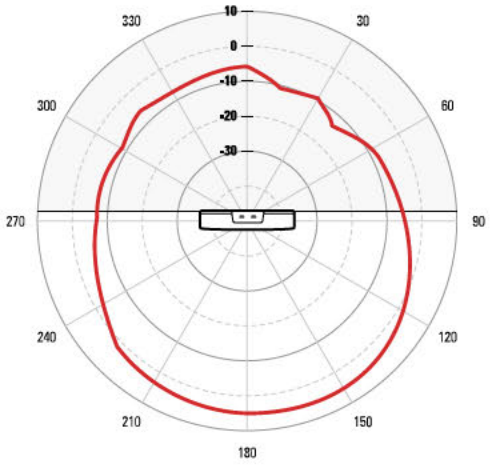


AP460S12C — Radiation Patterns

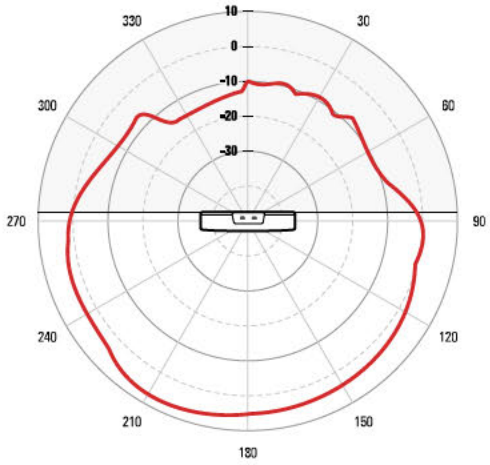
RADIO 0 AZIMUTH — 2.4 GHZ



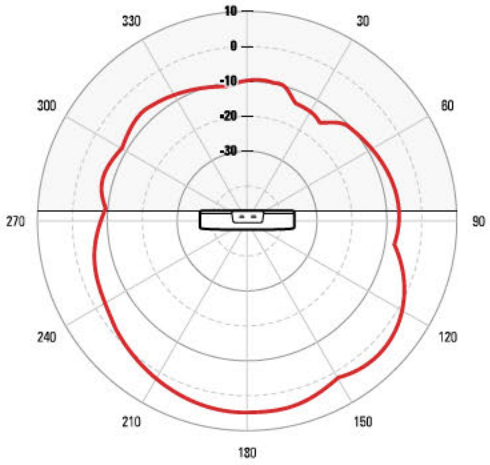
RADIO 0 ELEVATION — 2.4 GHZ



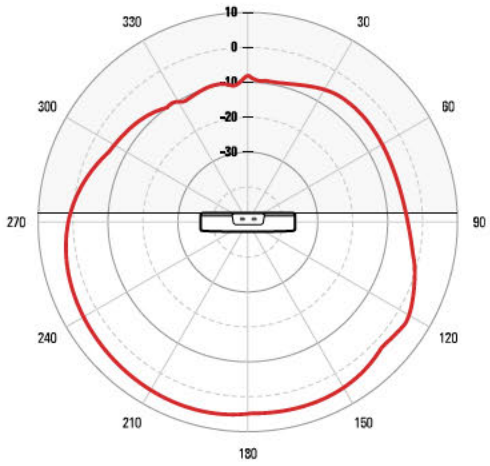
RADIO 0 AZIMUTH — 5 GHZ



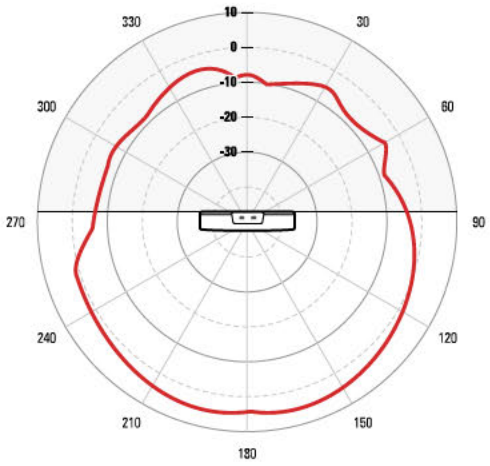
RADIO 0 ELEVATION — 5 GHZ



RADIO 1 AZIMUTH — 5 GHZ

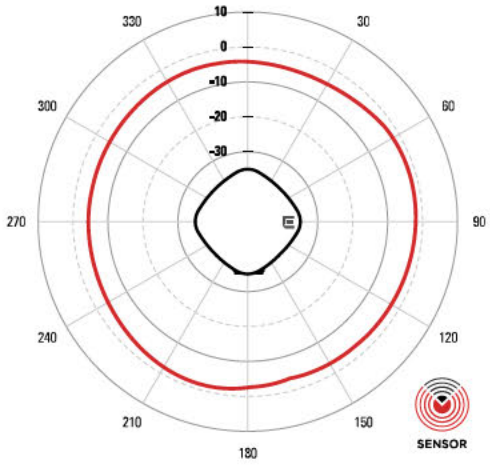


RADIO 1 ELEVATION — 5 GHZ

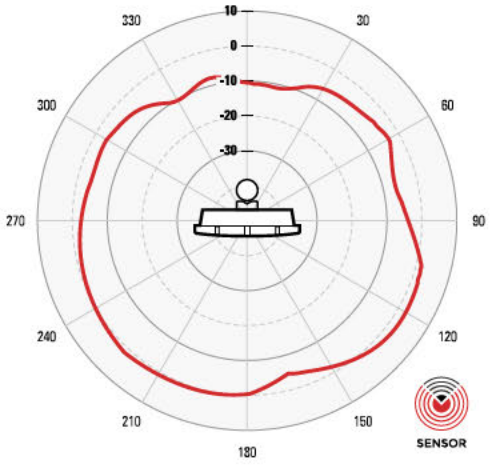


AP460S12C — Sensor Patterns

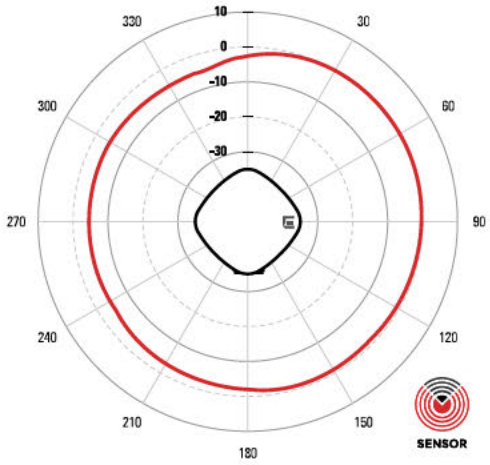
RADIO 0 AZIMUTH — 2.4 GHZ



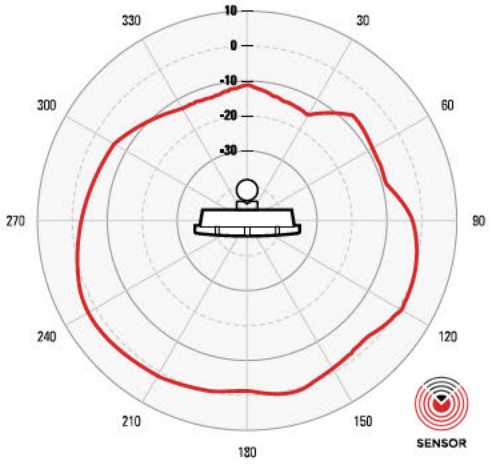
RADIO 0 ELEVATION — 2.4 GHZ



RADIO 0 AZIMUTH — 5 GHZ



RADIO 0 ELEVATION — 5 GHZ



Ordering Information

AP460 SKUs

SKU	Description
AP460C-FCC	ExtremeCloud IQ: Outdoor Tri Radio WiFi6 AP, 2.4 GHz, 5GHz, and Sensor w/Dual 5GHz and Mulitrate Port. Environmentally friendly, Light, power sensors, BLE. AI/ML green mode. ONMI antennas. NA
AP460C-CAN	ExtremeCloud IQ: Outdoor Tri Radio WiFi6 AP, 2.4 GHz, 5GHz, and Sensor w/Dual 5GHz and Mulitrate Port. Environmentally friendly, Light, power sensors, BLE. AI/ML green mode. ONMI antennas. T-Bar. Canada
AP460C-WR	ExtremeCloud IQ: Outdoor Tri Radio WiFi6 AP, 2.4 GHz, 5GHz, and Sensor w/Dual 5GHz and Mulitrate Port. Environmentally friendly, Light, power sensors, BLE. AI/ML green mode. ONMI antennas. T-Bar. Rest of World
AP460C-IL	ExtremeCloud IQ: Tri-radio Outdoor WiFi 6 AP (4x4 5 GHz, 2x2 dual band and 1x1 sensor). Dual 5GHz, 2.5 GE and 1 GE port . Integrated light/power sensors and BLE/Zigbee. AI/ML green mode. Internal OMNI antenna. Domain: Israel
AP460C-EG	ExtremeCloud IQ: Tri-radio Outdoor WiFi 6 AP (4x4 5 GHz, 2x2 dual band and 1x1 sensor). Dual 5GHz, 2.5 GE and 1 GE port . Integrated light/power sensors and BLE/Zigbee. AI/ML green mode. Internal OMNI antenna. Domain: Egypt
AP460S6C-FCC	ExtremeCloud IQ: Outdoor Tri Radio WiFi6 AP, 2.4 GHz, 5GHz, and Sensor w/Dual 5GHz and Mulitrate Port. Environmentally friendly, Light, power sensors, BLE. AI/ML green mode. Internal 60° Sector. NA
AP460S6C-CAN	ExtremeCloud IQ: Outdoor Tri Radio WiFi6 AP, 2.4 GHz, 5GHz, and Sensor w/Dual 5GHz and Mulitrate Port. Environmentally friendly, Light, power sensors, BLE. AI/ML green mode. Internal 60° Sector. Canada
AP460S6C-WR	ExtremeCloud IQ: Outdoor Tri Radio WiFi6 AP, 2.4 GHz, 5GHz, and Sensor w/Dual 5GHz and Mulitrate Port. Environmentally friendly, Light, power sensors, BLE. AI/ML green mode. Internal 60° Sector. Rest of World
AP460S12C-FCC	ExtremeCloud IQ: Outdoor Tri Radio WiFi6 AP, 2.4 GHz, 5GHz, and Sensor w/Dual 5GHz and Mulitrate Port. Environmentally friendly, Light, power sensors, BLE. AI/ML green mode. Internal 120° Sector. NA
AP460S12C-CAN	ExtremeCloud IQ: Outdoor Tri Radio WiFi6 AP, 2.4 GHz, 5GHz, and Sensor w/Dual 5GHz and Mulitrate Port. Environmentally friendly, Light, power sensors, BLE. AI/ML green mode. Internal 120° Sector. Canada
AP460S12C-WR	ExtremeCloud IQ: Outdoor Tri Radio WiFi6 AP, 2.4 GHz, 5GHz, and Sensor w/Dual 5GHz and Mulitrate Port. Environmentally friendly, Light, power sensors, BLE. AI/ML green mode. Internal 120° Sector. Rest of World
Power Accessories	
PD-9001GO-ENT	Outdoor 802.3at PoE single port midspan
AH-ACC-PW-CBL-US	6ft 18 AWG universal power cord with US plug
AH-ACC-PW-CBL-UK	6ft universal power cord with UK plug
AH-ACC-PW-CBL-EU	6ft universal power cord with EU plug
AH-ACC-PW-CBL-AU	6ft universal power cord with AU plug
AH-ACC-PW-CBL-JP	6ft universal power cord with Japan plug
AH-ACC-PW-CBL-KR	6ft universal power cord with Korea plug
Other Accessories	
ACC-WIFI-MICRO-USB	Micro-USB to USB Console Adapter Cable for Extreme Wireless Access Points

Mounting Options

Option 1: Mount to Pole or Wall Vertically

Marketing Part #	Outdoor AP Mounting Accessories	
AH-ACC-STRP-MRN	Outdoor access point stainless steel hose strap for 3" – 7" diameter Pole	Order (2) for mounting to pole AP460C, AP460S6C, AP460S12C
AH-ACC-BKT-ASM	Outdoor access point stainless steel wall bracket assembly	Allows AP460C, AP460S6C, AP460S12C to mount to wall

Note: Order quantity (2) AH-ACC-STRP-MRN for pole mounting

Option 2: Mount to Pole or Wall with +/– 15-Degree Tilt

Marketing Part #	Outdoor AP Mounting Accessories	
ACC-MBO-KT-AX	Adaptor bracket for Outdoor AP460xxxC to for tilting (KT-147407-02, KT-150173-01, or MBO-ART02)	Adapter bracket for outdoor access point to tilt
KT-147407-02	OUTDOOR HDW KIT SS HARSH ENVIRONMENTS	Allows +/– 15-degree tilt – wall or pole mount
KT-150173-01	OUTDOOR AP 12 IN EXT ARM FOR MNTG KIT	Allows 12" extension – use with KT-147407-02

Option 3: Mount to Wall with > 15-Degree Tilt

Marketing Part #	Outdoor AP Mounting Accessories	Comments
ACC-MBO-KT-AX	Adaptor bracket for Outdoor AP460xxxC to for tilting (KT-147407-02, KT-150173-01, or MBO-ART02)	Adapter bracket for outdoor access point to tilt
MBO-ART02	MBO-ART02 Articulating Mtg Brkt	allows > 15-degree tilt - wall mount

Warranty

The AP460C models are covered under Extreme's Universal LLW policy. For warranty details, please visit: www.extremenetworks.com/support/policies.

Wi Fi 6 CERTIFIED

Extreme networks

http://www.extremenetworks.com/contact

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AP4060

Key Highlights

- Wi-Fi 7 technology - high throughput, low latency, and extended range
- Cloud-managed - simplifies operations and reduces risk
- AIOps provides proactive insights for reducing MTTR
- Mobile app helps easily onboard, provision, and troubleshoot the wireless network
- Standard power for US and Canada

AP Radio Features

- Data Radios (2x2:2): 2.4 GHz, 5 GHz, 6 GHz and dedicated sensor
- Dual IoT Radios

Operational Modes

- Mode 1: 2.4 GHz /5 GHz/6 GHz data radios and sensor
- Mode 2: 2.4 GHz, and dual 5 GHz, and sensor

Cellular Coexistence Filter (CCF)

- Minimizes the impact of interference from cellular networks

Fully Functional with 802.3at

Designed for Harsh Environments

- IP67 Outdoor Rated
- Extended temperature range, -40°C to +60°C



Flexible, Highly Secure and Cloud-Managed, Wi-Fi 7 Outdoor Access Point

The AP4060 is an ExtremeCloud IQ-managed, Wi-Fi 7 outdoor access point (AP) that delivers increased performance and security across a range of use cases for a seamless wireless experience. This AP is built on Extreme's industry-leading Universal Hardware technology, enabling investment protection and deployment flexibility. It simplifies operations, reduces risk and saves time by leveraging ExtremeCloud IQ with artificial intelligence for IT operations (AIOps). The AP4060 can also automatically enforce secure access rules from ExtremeCloud Universal ZTNA - to act as a gatekeeper for preventing attacks at the periphery of the network.

The AP4060 Wi-Fi 7 Access Point is engineered for peak performance in enterprise environments, featuring a quad-radio design with three 2x2:2 radios and a dedicated sensor. It is designed for harsh environments, from hurricane force winds to sub-zero temperature. The AP4060 is IP67 outdoor rated and extends Extreme's Wi-Fi 7 coverage outdoors in a sleek form factor.

With support across the 6 GHz, 5 GHz, and 2.4 GHz bands, it delivers the next generation of high-efficiency, high-performance connectivity using 802.11be, also known as Extremely High Throughput (EHT). In addition to its advanced speed and bandwidth capabilities, the AP4060 includes a full-time dedicated security sensor, ensuring robust protection while maintaining optimal network performance.

Extreme offers one of the most extensive selections of switches to connect Wi-Fi 6E and Wi-Fi 7 access points. The switches that connect the APs include flexible PoE that offer 30/60/90 watts of power on their multi-gigabit ports to support the higher power requirements of 6 GHz Wi-Fi.

Business Benefits and Outcomes

Improve Operational Efficiency

The AP4060 is part of a complete wired and wireless solution that combines AIOps provided by ExtremeCloud IQ, Extreme's Universal Wired portfolio, and advanced security from ExtremeCloud Universal ZTNA. Using powerful 802.11be Wi-Fi 7 technology, this solution allows deployment of high-speed and highly secure Wi-Fi into a broad range of environments including high-density venues. ExtremeCloud IQ improves operational efficiency through powerful cloud-based management capabilities across the wired and wireless infrastructure.

Reduce Risk

With more users, more devices, more applications, and more threats straining the network, the AP4060 was engineered to meet these performance and security challenges. Unlike other APs that scan only part time, the AP4060 features a dedicated tri-frequency sensor that monitors rogue devices full time, eliminating the risk of vulnerability and attacks.

The AP4060, as part of the Extreme Universal Wireless portfolio, allows the user to change an operating system use case without changing the hardware, providing deployment flexibility.

Enhance User Experiences

The enhanced user experience with a Wi-Fi 7 AP4060 access point is marked by ultra-high speeds, low latency, and exceptional connectivity, even in dense or complex environments. Leveraging Wi-Fi 7's Extremely High Throughput (EHT) technology, users enjoy faster downloads, smoother streaming, and more responsive real-time applications like video conferencing and data intensive tasks.

AIOps and Cloud Management

The AP4060 is managed by ExtremeCloud IQ with innovative AIOps capabilities that streamline operations by delivering new levels of network visibility, automation, and intelligence using Explainable ML (machine learning). ExtremeCloud IQ incorporates many AIOps features such as network and client insights that help users reduce mean time to resolution (MTTR).

Network and client insights provide device-generated telemetry data that is depicted in both real-time and historical dashboard views with the ability to drill-down to details. The Client Monitor feature helps identify and troubleshoot network events that clients typically encounter when associating with an AP, authenticating, and accessing the network. Intelligent automation triggers dynamic packet capture (PCAP) to collect salient data used for root cause analysis, and to suggest remediation.

ExtremeCloud IQ includes advanced capabilities to simplify and enhance daily operations. Updated Wi-Fi maps display real-time radio frequency (RF) and responsive views at scale. Users can visualize active channel plans on all three bands: 2.4GHz Wi-Fi and Bluetooth Low Energy (BLE), plus 5 and 6 GHz Wi-Fi. It includes a scaling tool with definable wall types, custom attenuation values, an AP expandible device modal, and client information modals.

Templates for APs enable rapid deployment, with most of the port settings already applied by the associated template. The ExtremeCloud IQ Companion mobile app, for Android and iOS, helps simplify the provisioning and configuration of devices and creates a full installation report. This allows users to monitor and access details about the network from any location in near real time, and it includes a comprehensive troubleshooting toolbox.

Wi-Fi 7 (802.11be) Technology

Wi-Fi 7 (802.11be) introduces benefits across the 2.4 GHz, 5 GHz, and 6 GHz bands with reduced latency and jitter for time-sensitive networking applications. Wi-Fi 7 capabilities such as 320 MHz channels, 4K-QAM, and Multi-Link Operation (MLO) helps enable superior speeds and high-density performance. The 6 GHz band enables improved quality of service (QoS) in dense environments, new applications and use cases, and an improved user experience.

* Country dependent

Universal Hardware

The AP4060 is built with Extreme's Universal Hardware technology that allows multiple deployment use cases through a simple change of the software or feature set. Universal hardware platforms increase flexibility and reduce obsolescence by allowing customers to gradually adopt new technologies without the need for a rip and replace approach to their hardware.

Offered with a Universal World SKU AP, the AP4060 allows customers, partners, and distributors to order one model for any region where Extreme Networks products are sold, replacing the age-old problem of country-specific models.

Software-Defined Radios

The Wi-Fi 7 AP4060 features two distinct software defined radio (SDR) modes for different deployment scenarios. Dual 5 GHz supports high-density deployments with a dedicated sensor. The AP4060 is a quad radio AP that can transmit with multiple combinations of three data radios across the 2.4 GHz, 5 GHz, and 6 GHz bands in addition to an always-on dedicated tri-frequency sensor. The AP4060 intelligently monitors the software-configurable radios, enabling network managers to configure network RF technology based on the user environment and to configure the APs in different modes as required. The AP4060 features superior tri-frequency radio performance with a multiband filter that reduces interference and enables 5 GHz and 6 GHz operation across all available channels without restrictions.

Security

The AP4060 delivers the highest level of security services, beginning with support for the latest Wi-Fi Alliance WPA3 security certifications. The AP4060 also acts as an enforcement point for ExtremeCloud Universal ZTNA – the industry's most complete network access security solution. Universal ZTNA provides automated security policy enforcement and manages SSIDs to enforce policies on the AP4060. Extreme Fabric adds additional security by automating provisioning and deployment by connecting to a Fabric -enabled switch. Additionally, the AP supports a stateful L2-L7 DPI firewall for context-based access security, tri-frequency security, a location analytics sensor, and much more. The AP4060 also includes a unique dedicated security sensor for rich insights and threat detection when paired with Extreme AirDefense.

Modern IoT Platform

To support both IoT and guest engagement services, the AP4060 integrates Bluetooth® to connect with IoT devices wirelessly and to engage loyal customers with Apple iBeacon. Enterprises can use API-driven applications to send advertisements directly to shoppers, guests, and conference attendees. This makes it ideal for businesses to advertise their app, download pages, captive portals, or site-specific information. The AP4060 features dual IoT radios, enabling multiple concurrent IoT use cases and eliminates the need for an overlay infrastructure with improved performance and reduced complexity of multiple wireless networks.

Product Specifications

Radio Specifications

Max Users

SSID per Radio/Total: 16/48

Users per Radio/total: 512/1536

802.11a

5.150 GHz–5.850 GHz Operating Frequency

Orthogonal Frequency Division Multiplexing (OFDM) Modulation

Rates (Mbps): 54, 48, 36, 24, 18, 12, 9, 6 w/auto fallback

802.11b

2.4 GHz–2.5 GHz Operating Frequency

Direct-Sequence Spread-Spectrum (DSSS) Modulation

Rates (Mbps): 11, 5.5, 2, 1 w/auto fallback

802.11g

2.4 GHz–2.5 GHz Operating Frequency

Orthogonal Frequency Division Multiplexing (OFDM) Modulation

Rates (Mbps): 54, 48, 36, 24, 18, 12, 9, 6 w/auto fallback

802.11n

2.4 GHz–2.5 GHz and 5.150–5.850 GHz Operating Frequency

802.11n Modulation

HT20 High-Throughput (HT) Support (for both 2.4 GHz and 5 GHz)

HT40 High-Throughput (HT) Support for 5 GHz

A-MPDU and A-MSDU Frame Aggregation

Rates (Mbps): MCS0 – MCS31 (6.5Mbps - 600Mbps)

802.11ac

5.150 GHz–5.850 GHz Operating Frequency

802.11ac Modulation (256-QAM)

5G: 2x2 Multiple-In, Multiple-Out (MIMO) Radio

2.4G: 2x2 Multiple-In, Multiple-Out (MIMO) Radio

Rates (Mbps): MCS0–MCS9 (6.5Mbps), 1733Mbps, NSS = 1-2.

2x2:2 Stream Multiple-In, Multiple-Out (MIMO) Radio

VHT20/VHT40/VHT80/VHT160

TxBF (Transmit Beamforming)

802.11ax

2.4 GHz-2.5GHz, 5.15 GHz-5.850 GHz and 5.925 GHz-7.125 GHz Operating Frequencies

802.11ax Modulation (1024-QAM)

Dual-band OFDMA

Rates (Mbps):

• 6G Rate: HE0-HE11 (8 Mbps – 2,400 Mbps)

• 5G Rate : HE0-HE11 (8 Mbps – 2,400 Mbps)

• 2.4G Rate: HE0-HE11 (8Mbps – 574 Mbps)

2x2:2 Stream Multiple-In, Multiple-Out (MIMO) Radio at 6 GHz

2x2:2 Stream Multiple-In, Multiple-Out (MIMO) Radio at 5 GHz

2x2:2 Stream Multiple-In, Multiple-Out (MIMO) Radio at 2.4 GHz

HE20/HE40/HE80/HE160/HE320 support for 6 GHz

HE20/HE40/HE80/HE160 support for 5 GHz

HE20/HE40 support for 2.4 GHz

UL/DL SU-MIMO and MU-MIMO

TxBF (Transmit Beamforming)

802.11be

2.4 GHz–2.5GHz, 5.15 GHz–5.850 GHz, and 5.925 GHz–7.125 GHz Operating Frequencies

802.11be modulation (4096-QAM)

Rates (Mbps):

• 6G: EHT0-EHT13 (8Mbps–5,765 Mbps)

• 5G: EHT0-EHT13 (8Mbps–2,882 Mbps)

• 2.4G: EHT0-EHT13 (8Mbps–688 Mbps)

2x2:2 stream MIMO radio at 6 GHz

2x2:2 stream MIMO radio at 5 GHz

2x2:2 stream MIMO radio at 2.4 GHz

EHT20/EHT40/EHT80/EHT160/EHT320 support for 6 GHz

EHT20/EHT40/EHT80/EHT160 support for 5 GHz

EHT20/EHT40 support for 2.4 GHz

UL/DL SU-MIMO and MU-MIMO

TxBF (Transmit Beamforming)

Dual IoT Radios

(2) radios for Thread, Zigbee®, Bluetooth 5.4 Low Energy, IEEE 802.15.4 Thread

Interfaces

Eth0, Eth1: (2) wired Ethernet ports (RJ45)

Eth0: 100/1000/2500/5000 Mbps autosensing link speed Ethernet port, PoE PD

Eth1: 100/1000/2500 Mbps autosensing link speed Ethernet port, PoE PD

802.3az Energy-Efficient Ethernet (EEE)

Power Options

Power Draw: 802.3at PoE: Typical 21W

PoE Failover

Physical Specifications

Dimensions: 9.8 in. x 9.8 in. x 2.9 in. (251 mm x 251 mm x 73.7 mm)

Security

Trusted Platform Module (TPM)

Internal Antennas

(2) dual band 2.4 GHz and 5 GHz

(2) dual band 5 GHz and 6 GHz

(1) 2 GHz/5 GHz/6 GHz sensor
(3) IoT sensor
(1) GPS

Mounting

15 Degree Tilt: KT-147407-02
12 in. Extension: KT-150173-01
80 Degree tilt + Ext.: MBO-ART03

Environmental Specifications

Operating: -40°C to 60°C (-40°F to 140°F)
Storage: -40°C to 70°C (-40°F to 158°F)
Humidity: 0% to 95% (non-condensing)
Wind Rating: 165 Mph sustained winds
Operational Shock: IEC60721-3-4, Class 4M3; ASTM D3332-99; MIL STD 810H Method 516
Operation Vibration: ASTM D3580-95, IEC60721-3-4, Class 4M3 (IEC 60068-2-64)

Environmental Compliance

EU RoHS – 2011/65/EU and Amendments(EU) 2015/863
EU WEEE – 2012/19/EU
EU REACH - Regulation (EC) No 1907/2006 – Reporting
EU SCIP – EU Waste Framework Directive
China RoHS – 2 SJ/T 11364-2014
Taiwan RoHS CNS 15663 (2013.7)

Regulatory Compliance

Radio Standards USA

Part 15C - 15.247
Part 15E - 15.407
RF exposure - FCC Part 1.1307

Radio Standards Canada

RSS 247 for 2.4GHz and 5GHz
RSS 248 6GHz RLAN
RF exposure - RSS-102: Issue 5, 2015

Radio Standards CE

2014/53/EU Radio Equipment Directive
EN 300 328, EN 301 893, EN 302 502, EN 300 440
EN301 489 1, EN 301 489 17, EN 62311, EN50385

Regulatory and Safety

North American ITE

UL 60950-1 2nd edition Listed device (U.S.)
CSA 22.2 No. 60950-1 2nd edition 2014 (Canada)
UL/CuL 62368-1 Listed

European ITE

EN 62368-1
2014/35/EU Low Voltage Directive

International ITE

CB IEC 62368-1 2nd Edition + National Differences
CB IEC 62368-1 1st and 3rd Editions + National Differences
AS/NZS 62368-1 (Australia /New Zealand)

EMI/EMC Standards

North American EMC Standards

FCC CFR 47 part 15 Class B (USA)
ICES-003 Class B (Canada)

European EMC Standards

EN 55032 Class B
EN 55035
EN 55011
EN 60601-1-2
EN 61000-3-2: (Harmonics)
EN 61000-3-3 (Flicker)
2014/30/EU EMC Directive

International EMC Certifications

CISPR 32 Class B (International Emissions)
CISPR 11
AS/NZS CISPR 32
CISPR 35 (International Immunity)

Ordering Information

AP4060 Series - SKUs

Part number	Description
AP4060-WW	Outdoor Quad Radio Wi-Fi 7 (2x2:2): 2.4GHz, 5GHz, 6GHz and dedicated sensor, Multi-Rate Port, internal antennas. Domain: World SKU
AP4060-WW-TAA	Outdoor Quad Radio Wi-Fi 7 (2x2:2): 2.4GHz, 5GHz, 6GHz and dedicated sensor, Multi-Rate Port, internal antennas. Domain: World SKU TAA Compliant

Mounting Options

Table 1: Option 1: Mount to a Pole or a Wall Vertically

Part number	Outdoor AP Mounting Accessories	Notes
AH-ACC-STRP-MRN	Outdoor access point stainless steel hose strap for 3 in. – 7 in. diameter pole	Order (2) for mounting AP4060 to a pole
AH-ACC-BKT-ASM	Outdoor access point stainless steel wall bracket assembly	Allows AP4060 to mount to a wall

Note: Order quantity (2) AH-ACC-STRP-MRN for pole mounting

Table 2: Option 2: Mount to a Pole or a Wall with +/- 15-Degree Tilt and/or Extension

Part number	Outdoor AP Mounting Accessories	Notes
ACC-MBO-KT-AX	Adapter bracket for AP4060 Outdoor tilting	Adapter bracket for outdoor access point to tilt
KT-147407-02	OUTDOOR HDW KIT SS HARSH ENVIRONMENTS	Allows +/– 15-degree tilt – wall or pole mount
KT-150173-01	OUTDOOR AP 12 IN EXT ARM FOR MNTG KIT	Allows 12 in. extension – use with KT-147407-02 for pole and/or tilt

Table 3: Option 3: Mount to a Wall with > 15-Degree Tilt and Variable Extension

Part number	Outdoor AP Mounting Accessories	Notes
ACC-MBO-KT-AX	Adapter bracket for AP4060 Outdoor tilting and variable extension lengths (7.0 in., 8.5 in., and 10.0 in.)	Adapter bracket for outdoor access point to tilt
MBO-ART03	MBO-ART03 Articulating Mounting Bracket	Allows 2 axis +/- 80-degree tilt (20-degree increments) and 10 inches extension - wall

Power accessories

Part number	Description
PD-9001GO-ENT Outdoor 802.3at PoE single port midspan	Outdoor 802.3at PoE single port midspan

See Product Installation Guide for more details.

Disclaimer

Specifications described in this document are preliminary and subject to change. Extreme Networks reserves the right to modify the specifications in this document without notice. Please check with your Extreme Networks point of contact for the most up to date information.

Warranty

The AP4060 is covered under Extreme's Universal LLW policy. For warranty details, visit: http://www.extremenetworks.com/support/policies

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Universal Wireless AP5020

Highlights

Advanced Radio Technology

Tri-Radio Design

- 2.4 GHz (4x4:4)
- 5 GHz (4x4:4)
- 6 GHz (4x4:4)

Operational Modes

- Mode 1: 2.4/5/6 GHz Data Radios
- Mode 2: 5/6 GHz Data Radios + Tri-frequency sensor or 2.4/5 GHz Data Radios + Tri-frequency sensor
- Mode 3: 5/5 GHz + 6 GHz Data Radios
- Mode 4: 5/5 GHz + 2.4 GHz Data Radios

Dual IoT Radio

Software-Defined Radios

2x2 Tri-frequency sensor (2.4 GHz/5 GHz/6 GHz)

Universal Hardware Platform

- On-Premises: ExtremeCloud IQ Controller
- Cloud: ExtremeCloud IQ

Superior Tri-Frequency Radio Performance

- Multi-band filter reduces interference and enables 5 GHz and 6 GHz operation across all available channels without restrictions

WPA3 Support

- Includes the latest WPA3 WI-FI security standard delivering robust protections for users and IoT devices

Cellular Coexistence Filter (CCF)

- Minimizes the impact of interference from cellular networks

Fully Functional with 802.3bt

Built-in PoE Failover or PSE Out

Smart Management Choices

- ExtremeCloud IQ for public, private, and ExtremeCloud Edge cloud management capabilities
- ExtremeCloud IQ Controller is ideal for on-premises requirements



Wi-Fi 7 Tri-Radio Indoor Access Point with Support for Multiple Extreme Operating Systems

The AP5020 is an Enterprise Universal and World SKU Wi-Fi 7 Wireless access point, enabling flexible deployment for on-premises or cloud, and a simplified sales ordering process. The World SKU allows customers, partners, and distributors to order one model for any region, replacing the age-old problem of country specific models. ExtremeCloud™ IQ geo-locates the access point and accurately provides it the corresponding set of channel and power specifications that the product can operate under in that country.

The AP5020 Wi-Fi 7 access point, with three 4x4:4 radios, provides high-efficiency, high-performance 802.11be aggregate data rates up to 20 Gbps in the 6 GHz, 5 GHz, and 2.4 GHz bands. Designed for high density environments, such as schools, warehouses, healthcare facilities, and stadiums, the AP5020 is powerful and intelligent enough to provide the highest level of client services without compromising security. Despite powerful capabilities, the AP5020 can operate with fully-featured performance capabilities using 802.3bt PoE, simplifying power capacity planning.

With more users, more devices, more applications, and more threats straining the infrastructure, the AP5020 was engineered to meet those challenges. The AP5020 combines powerful 802.11be Wi-Fi 7 technology, advanced security, and ML/AI management capabilities together as an enterprise-class solution that allows you to deploy high speed, highly secure Wi-Fi into high-density environments.

Unlike other access points that scan only part-time or use 1x1 sensors, the AP5020 features a dedicated 2x2 tri-frequency sensor that monitors for rogue devices full time, eliminating the risk of vulnerability and attacks. This tri-radio AP is capable of multiple operating modes, optimizing for maximum performance without trading off security.

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Wi-Fi 7 (802.11be) Technology

With the introduction of Wi-Fi 6E came the availability of Wi-Fi operation in the 6 GHz band for unlicensed operation. This increases the available spectrum by up to 1,200 MHz*, which is three times that of existing 'usable' spectrum which enables improved quality of service (QoS) in dense environments, new applications and use cases, and an improved user experience. Wi-Fi 7 (802.11be) introduces additional benefits across the 2.4, 5, and 6 GHz bands with reduced latency and jitter for time sensitive networking applications.

Management Analytics

In conjunction with Extreme centralized management software, cloud or on-premises, the AP5020 provides a rich set of data displayed via widgets, representing enhanced historical data or a combination of historical and current data. This provides context-specific granularity with perspective views for locations, network, APs, individual client devices, as well as policy roles. In each context, administrators can make a widget library. ExtremeCloud IQ CoPilot leverages Explainable Machine Learning (ML) insights to help improve user experiences.

Software-Defined Radio

The AP5020 has multiple software programmable modes to optimally manage radios to provide the highest level of client performance. The AP5020 is a tri-radio access point can transmit with multiple combinations of three data radios and a dedicated tri-frequency sensor. The AP5020 intelligently monitors the software-configurable radios, enabling network managers to configure network RF technology based on the user environment and configure the access points in different modes as required.

*Country Dependent

Security

The AP5020 delivers the highest level of security services, beginning with support for the latest Wi-Fi Alliance WPA3 security certifications. Leverage Extreme Fabric Attach to securely automate provisioning and deployment by connecting to a Fabric Connect-enabled switch. Additionally, the access point supports a stateful L2-L7 DPI firewall for context-based access security, tri-frequency security, and Private Pre-Shared Key (PPSK), location analytics sensor and much more. Unique dedicated 2x2 security radio for rich insights and threat detection when pairing with Extreme AirDefense.

Universal Hardware

The AP5020 is a universal hardware platform that allows user choice of the Wi-Fi operating system (OS). Either the IQ Engine operating system or the ExtremeCloud IQ Controller Engine operating system persona can be enabled as required. The desired persona can be selected at start-up or changed at a later stage.

Once selected, the AP5020 assumes the features or capabilities of the selected OS. When first booted, the AP5020 automatically connects to ExtremeCloud™ IQ to find its persona. The pre-provisioned OS persona is then remotely enabled on the AP5020 system, eliminating the need for manual selection.

Modern IoT Platform

To support both IoT and Guest Engagement services, the AP5020 integrates Bluetooth® to connect with IoT devices wireless to engage loyalty customers with Apple iBeacon. Enterprises can use API driven applications to send advertisements directly to shoppers, guests, and conference attendees. This makes it ideal for businesses to advertise their app download pages, captive portals, or site-specific information. The AP5020 features a dual IoT radio, enabling multiple concurrent IoT use cases with improved coverage and performance. With IEEE 802.15.4 functionality, the AP5020 IoT radio enables simplified deployment of low-power BLE applications.

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Product Specifications

Radio Specifications

Max Users
- SSID per Radio/Total: 16/48
- Users per Radio/total: 512/1536

802.11a
- 5.150–5.850 GHz Operating Frequency
- Orthogonal Frequency Division Multiplexing (OFDM) Modulation
- Rates (Mbps): 54, 48, 36, 24, 18, 12, 9, 6 w/auto fallback

802.11b
- 2.4–2.5 GHz Operating Frequency
- Direct-Sequence Spread-Spectrum (DSSS) Modulation
- Rates (Mbps): 11, 5.5, 2, 1 w/auto fallback

802.11g
- 2.4–2.5 GHz Operating Frequency
- Orthogonal Frequency Division Multiplexing (OFDM) Modulation
- Rates (Mbps): 54, 48, 36, 24, 18, 12, 9, 6 w/auto fallback

802.11n
- 2.4–2.5 GHz and 5.150–5.850 GHz Operating Frequency
- 802.11n Modulation
- HT20 High-Throughput (HT) Support (for both 2.4 GHz and 5 GHz)
- HT40 High-Throughput (HT) Support for 5 GHz
- A-MPDU and A-MSDU Frame Aggregation
- Rates (Mbps): MCS0 – MCS31 (6.5MBps - 600Mbps)

802.11ac
- 5.150–5.850 GHz Operating Frequency
- 802.11ac Modulation (256-QAM)
- 5G: 4x4 Multiple-In, Multiple-Out (MIMO) Radio
- 2.4G: 4x4 Multiple-In, Multiple-Out (MIMO) Radio
- Rates (Mbps): MCS0–MCS9 (6.5Mbps), 3466Mbps, NSS = 1-4
- 4x4:4 Stream Multiple-In, Multiple-Out (MIMO) Radio
- VHT20/VHT40/VHT80/VHT160
- TxBF (Transmit Beamforming)

802.11ax
- 2.4-2.5GHz, 5.50-5.850 and 5.925-7.125 GHz Operating Frequencies
- 802.11ax Modulation (1024-QAM)
- Dual-band OFDMA
- Rates (Mbps):
  - 6G: HE0-HE11 (8 Mbps – 9600 Mbps)
  - 5G: HE0-HE11 (8 Mbps – 4800 Mbps)
  - 2.4G: HE0-HE11 (8Mbps – 1148 Mbps)
- 4x4:4 Stream Multiple-In, Multiple-Out (MIMO) Radio @6GHz
- 4x4:4 Stream Multiple-In, Multiple-Out (MIMO) Radio @5GHz
- 4x4:4 Stream Multiple-In, Multiple-Out (MIMO) Radio @2.4GHz
- HE20/HE40/HE80/HE160/HE320 support for 6 GHz
- HE20/HE40/HE80/HE160 support for 5 GHz
- HE20/HE40 support for 2.4 GHz
- UL/DL SU-MIMO and MU-MIMO
- TxBF (Transmit Beamforming)

802.11be
- 2.4-2.5GHz, 5.50-5.850 and 5.925-7.125 GHz Operating Frequencies
- 802.11be Modulation (4096-QAM)
- Rates (Mbps):
  - 6G: EHT0-EHT13 (8 Mbps – 11500 Mbps)
  - 5G: EHT0-EHT13 (8 Mbps – 5700 Mbps)
  - 2.4G: EHT0-EHT13 (8Mbps – 1300 Mbps)
- 4x4:4 Stream Multiple-In, Multiple-Out (MIMO) Radio @6GHz
- 4x4:4 Stream Multiple-In, Multiple-Out (MIMO) Radio @5GHz
- 4x4:4 Stream Multiple-In, Multiple-Out (MIMO) Radio @2.4GHz
- EHT20/EHT40/EHT80/EHT160/EHT320 support for 6 GHz
- EHT20/EHT40/EHT80/EHT160 support for 5 GHz
- EHT20/EHT40 support for 2.4 GHz
- UL/DL SU-MIMO and MU-MIMO
- TxBF (Transmit Beamforming)

Dual IoT Radio
- (2) Thread, Zigbee®, Bluetooth® 5.4 Low Energy, IEEE 802.15.4

Interfaces
- Eth0, Eth1: (2) Wired Ethernet ports (RJ-45)
  - 100/1000/2500/5000/10000 Mbps auto-sensing link speed Ethernet port, PoE PD
  - 100/1000/2500/5000 Mbps auto-sensing link speed Ethernet port, PoE PD in or 15.4W PSE out mode (requires 802.3bt on Eth0)
  - 802.3az Energy Efficient Ethernet (EEE)
- USB 2.0, Type A, 5V/400mA with PoE 802.3at or 5V/1000mA with PoE 802.3bt

Power Options
- Power Draw: 802.3at PoE: Typical TBD; Max: 25.5W (802.3at profile) w/o PoE out or USB
- Power Draw: 802.3bt: Max 35W with 5W USB
- 12VDC/3A. DC power has priority when both DC and PoE power sources are available
- PoE Failover or optional PSE Out supported

Physical Specifications
- Dimensions: 10.16" x 10.16" x 1.62" (258mm x 258mm x 41mm)
- Weight: 3.57 lbs (1.62 kg)

Security
- Kensington lock slot
- Trusted Platform Module(TPM)

Internal Antennas
- (4) Dual Banded 2.4 GHz and 5 GHz
- (4) Single band 6 GHz
- (2) 5/6 GHz Sensor
- (3) IoT Sensor

Mounting
- AP support 15/16 flush ceiling tile include in box
- Wall mount included in box or sold as an accessory
- Sculpted ceiling tile 15/16 wide t-bar sold as an accessory
- Sculpted ceiling tile 9/16 wide t-bar sold as an accessory
- Beam sold as an accessory
- Junction Box sold as an accessory
- IL or 9/16 t-bar sold as an accessory
- SL (Silhouette) sold as an accessory
- Wing Main Plate adaptor sold as an accessory
- Built in slot for Kensington

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Environmental Specifications

- Operating: AP5020: 0°C to 50°C (0°F to 122°F)
- Storage: 0°C to 70°C (32°F to 158°F)
- Humidity: 0% to 95% (non-condensing)

Environmental Compliance

- EU RoHS – 2011/65/EU & Amendments(EU) 2015/863
- EU WEEE – 2012/19/EU
- EU REACH - Regulation (EC) No 1907/2006 – Reporting
- EU SCIP – EU Waste Framework Directive
- China RoHS – 2 SJ/T 11364-2014
- Taiwan RoHS CNS 15663(2013.7)

Regulatory Compliance

Radio Standards

USA

- Part 15C - 15.247
- Part 15E - 15.407
- RF exposure - FCC Part 1.1307
- IEC 60601-1-2 EMC for medical devices

Canada

- RSS 247 for 2.4G & 5GHz
- RSS 248 6GHz RLAN
- RF exposure - RSS-102: Issue 5, 2015

CE

- 2014/53/EU Radio Equipment Directive
- EN 300 328, EN 301 893, EN 303 687, EN 300 440
- EN 301 489 1, EN 301 489 17, EN 62311, EN 50385

Regulatory and Safety

North American ITE

- UL 60950-1 2nd edition Listed device (U.S.)
- CSA 22.2 No. 60950-1 2nd edition 2014 (Canada)
- UL/CuL 62368-1 Listed
- UL 2043 Plenum rated

European ITE

- EN 62368-1
- 2014/35/EU Low Voltage Directive

International ITE

- IEC 60950-1 + National Differences
- CB IEC 62368-1 2nd Edition + National Differences
- CB IEC 62368-1 1st and 3rd Edition + National Differences
- AS/NZS 60950-1 (Australia/New Zealand)

EMI/EMC Standards

North American EMC Standards

- FCC CFR 47 part 15 Class B (USA)
- ICES-003 Class B (Canada)

European EMC Standards

- EN 55032 Class B
- EN 55035
- EN 55011
- EN 60601-1-2
- EN 61000-3-2: (Harmonics)
- EN 61000-3-3 (Flicker)
- 2014/30/EU EMC Directive

International EMC Certifications

- CISPR 32 Class B (International Emissions)
- CISPR 11
- AS/NZS CISPR32
- CISPR 24/CISPR 35 (International Immunity)

Warranty

The AP5020 is covered under Extreme's Universal LLW policy. For warranty details, please visit: www.extremenetworks.com/support/policies.

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Ordering Information

AP5020 - SKUs

Part Number	Description
AP5020-WW	Indoor Tri Radio Wi-Fi 7 AP (4x4:4): 2.4 GHz, 5 GHz, 6 GHz and Multirate Port, Internal antennas. T-Bar, Incl Mt (AH-ACC-BKT-AX-TB). Domain: World SKU

Mounting Accessories

Marketing Part #	Indoor AP Mounting	Notes
AH-ACC-BKT-AX-TB	Mounting bracket for prelude 15/16" and suprafine 9/16" ceilings and walls	Ships with AP5020 Can be used for wall - .25"
AH-ACC-BKT-AX-WL	Mounting bracket for direct-to-wall installations	Can be used for wall - 1.25"
AH-ACC-BKT-AX-IL	Mounting bracket for interlude ceilings	
AH-ACC-BKT-AX-SL	Mounting bracket for Armstrong 1/8" and 1/4" main beam silhouette reveal ceiling grids	Up to .33" ceiling tile protrusion
ACC-BKT-AX-JB	Junction box or wall mounting for indoor access points	Gang/Junction Box
ACC-BKT-AX-BEAM	Beam mounting for indoor access points	Up to 0.78" thick beam.
AH-ACC-BKT-916-KIT	9/16" ceiling mount brackets for Non-Flat/Protruded ceiling tiles - Use with AH-ACC-BKT-AX-TB	9/16" Non-Flat/Protruded ceiling tiles

Power Accessories

Part Number	Description
37219	PWR Adapter 12VDC, 3A, 2.5mm x 5.5mm connector

Other Accessories

Part Number	Description
ACC-WIFI-MICRO-USB	Micro-USB to USB Console Adapter Cable for Extreme Wireless Access Points

See Product Installation guide for more details

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Extreme 7520

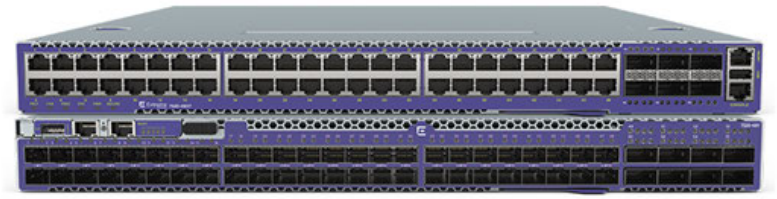


Highlights

- High-performance, fixed-form switches for leaf, spine, aggregation, or core applications
- Universal dual-persona hardware allows user choice of switch operating systems
- ExtremeCloud™ IQ and ExtremeCloud IQ - Site Engine for powerful, secure and easy to use cloud-based network management.
- Fabric Connect for automated network operations, simplified network provisioning and enhanced security

Key Hardware Features

- Three models – two models with no MACsec and one model with MACsec in a fixed 1U form factor
- AC and DC power options
- Back-to-front and front-to-back airflow options
- Up to 8-unit stacking
- Integrated Application Hosting enables 3rd-party applications without impacting switch performance
- Non-blocking, wire-speed design



Universal Aggregation/Core Switch Platform

The Extreme 7520 are purpose-built 48-port 10Gb and 48-port 25Gb switches designed for high-performance aggregation and core applications. As a universal hardware platform, the 7520 provides end-to-end secure network segmentation, in addition to advanced policy capabilities, with a user-selectable choice of Extreme's flagship switch operating systems. This makes the 7520 a uniquely flexible platform that can be deployed in a variety of aggregation and core environments.

The Extreme 7520 network hardware platform enables organizations to design networks that accommodate a variety of applications and east-west traffic patterns. With its high-density scale-out architecture, leading power efficiency, and airflow options, the 7520 platform delivers a cost-effective solution that optimizes power, cooling, and equipment room space, wherever your network operating center might be.

Three models of the 7520 are available.

7520-48XT-6C

- 48 x 1Gb/10Gb 10GBaseT copper ports (no MACsec)
- 6 x 40Gb/100Gb QSFP28 fiber ports (no MACsec)

7520-48Y-8C

- 48 x 1Gb/10Gb/25Gb SFP28 fiber ports (no MACsec)
- 8 x 40Gb/100Gb QSFP28 fiber ports (no MACsec)

7520-48YE-8CE

- 48 x 10/25Gb SFP28 fiber ports with MACsec support
- 8 x 100Gb QSFP28 fiber ports with MACsec support

Universal Hardware Platform

The 7520 Series comes with a dual-persona capability allowing user choice of the switch operating system (OS). Either the Switch Engine (EXOS) or Fabric Engine (VOSS) persona can be enabled on 7520 hardware models. The desired persona can be selected at start-up or changed at a later stage. Once selected, the 7520 assumes the features/capabilities of the selected OS.

7520 persona activation can be done manually at boot-up, including via the system CLI. Or, it can be automated by pre-provisioning the 7520 persona in ExtremeCloud IQ. When first booted, the 7520 automatically connects to ExtremeCloud IQ to find its persona. The pre-provisioned OS persona is then remotely enabled on the 7520 system – eliminating the need for manual selection.

Ethernet Fabric Services

The 7520 supports a variety of Ethernet Fabric services, including Extreme's Fabric Connect when running Fabric Engine (VOSS) and Extreme's IP Fabric when running Switch Engine (EXOS). It also supports Fabric Attach for automated connection to either Layer 2 or Layer 3 fabric services. Extreme's Fabric Connect and IP Fabric on the 7520 enable the creation of virtualized networks that automate network operations, simplify network provisioning, and enhance security, all while reducing the strain on network and IT personnel.

High-Performance Stacking

Two of the 7520's QSFP28 uplink ports can be used for high-speed 400Gb stacking when running Switch Engine (EXOS). Up to eight systems can be stacked using qualified direct attach cables and/or optical transceivers. (Note: Stacking is not supported when running Fabric Engine (VOSS)).

Management

The 7520 can be managed by ExtremeCloud IQ and ExtremeCloud IQ-Site Engine for comprehensive unified management with a consolidated view of users, devices and applications across wired and wireless networks.

Zero-touch provisioning from ExtremeCloud IQ lets one quickly bring new 7520 switches online as well as enable the selection of the operating system (OS) persona. Alternatively, 7520 on-box management can be done manually via a web-based GUI or generic CLI.

Switch Specifications

Model	7520-48Y-8C 7520-48YE-8CE	7520-48XT-6C
Ports	• 48 x 1/10/25GbE SFP28 ports (48Y/8C) • 48 x 10/25GbE SFP28 ports (48YE-8CE) • 8 x 40/100GbE QSFP28 ports • 1 x Serial console port RJ-45 • 1 x 10/100/1000BASE-T out-of-band management port • USB Type A storage port	• 48 x 1/10GbE 10GBaseT ports • 6 x 40/100GbE QSFP28 ports • 1 x Serial console port RJ-45 • 1 x 10/100/1000BASE-T out-of-band management port • USB Type A storage port
Power Supplies	• Modular 800W AC power supply (up to two PSUs) • Modular 800W DC power supply (up to two PSUs) • Front to Back and Back to Front airflow option	• Modular 800W AC power supply (up to two PSUs) • Modular 800W DC power supply (up to two PSUs) • Front to Back and Back to Front airflow options
Fan Modules	• 6 fan modules • Front-Back and Back-Front airflow options	• 6 fan modules • Front-Back and Back-Front airflow options
Dimensions	• 17.3in W/21.24in D/1.7in H (44.0cm/53.95cm/4.3cm) (48Y-8C) • 17.31in W/21.69in D/1.71in H (44.0cm/53.95cm/4.3cm) (48YE-8CE)	• 17.3in W/20.9in D/1.7in H (44.0cm/53.2cm/4.3cm)
Weight	• 16.71 lb (7.58 kg) empty chassis (48Y-8C) • 22.29 lb (10.11 kg) with two AC PSUs (-F and -R models) (48Y-8C) • 20.35 lb (9.23 kg) empty chassis (48YE-8CE) • 26.23 lb (11.90 kg) with two AC PSUs (-F and -R models) (48YE-8CE)	• 16.34 lb (7.41 kg) no PSU • 20.88 lb (9.47 kg) with two AC PSUs (-F and -R models)
Performance	• Line rate 4 Tbps Switching Capacity (2 Tbps ingress, 2 Tbps egress) • Typical Latency: 800 ns • Forwarding rate: 1000 Mpps	• Line rate 2.16 Tbps Switching Capacity (1.08 Tbps ingress, 1.08 Tbps egress) • Typical Latency: 2,400 ns • Forwarding rate: 1000 Mpps
CPU/Memory	• 8-core Processor • 16GB DDR4 ECC memory • 128GB SSD memory	• 8-core Processor • 16GB DDR4 ECC memory • 128GB SSD memory
Packet Buffers	32MB	32MB
Environmental Operating Conditions	AC/DC, one fan failed, front-to-back: • 0°C (32°F) to 50°C (122°F) at sea level; • 0°C (32°F) to 40°C (104°F) up to 3000 m (10,000 ft) AC/DC, one fan failed, back-to-front: • 0°C (32°F) to 45°C (113°F) at sea level; • 0°C (32°F) to 40°C (104°F) up to 3000 m (10,000 ft)	AC/DC, one fan failed, front-to-back: • 0°C (32°F) to 50°C (122°F) at sea level; • 0°C (32°F) to 40°C (104°F) up to 3000 m (10,000 ft) AC/DC, one fan failed, back-to-front: • 0°C (32°F) to 45°C (113°F) at sea level; • 0°C (32°F) to 40°C (104°F) up to 3000 m (10,000 ft)

7520 Software Scaling Values

Switch Engine

MAC Table: 294,000

IPv4 ARP Table: 172,000

IPv4 Route Table: 294,000

IP Multicast Entries (S,G,V): 110,000

IPv6 Neighbor Table: 78,000

IPv6 Route Table: 218,000

ACLs (Ingress/Egress): 38,864/2,048

QoS Egress Queues per port: 8
VLANs: 4,094
Routed VLANs: 4,094

One Policy Scaling

Policy Profiles: 63
Unique Permit/Deny Rules per switch: 16,312

Fabric Engine

MAC Table: 164,000
IPv4 ARP Table: 65,536
IPv4 Route Table: 24,576
IP Multicast Entries (S,G,V): 6,000
IPv6 Neighbor Table: 32,768
IPv6 Route Table: 12,288
ACLs (Ingress/Egress): 8,192/6,144
QoS Egress Queues per port: 8
VLANs: 4,059
IP Interfaces (Routed VLANs): 1,000

Fabric Connect Scaling

Fabric Adjacencies per switch: 255
BEB Nodes per VSN: 2,000
L2 VSNs: 4,000
L3 VSNs: 256

Power and Heat Dissipation

Switch Model	Minimum Heat Dissipation (BTU/hr) (Idle, no ports linked)	Minimum Power Consumption (W) (Idle, no ports linked)	Maximum Heat Dissipation (BTU/hr) (Fans high, all ports 100% traffic)	Maximum Power Consumption (W) (Fans high, all ports 100% traffic)
7520-48XT-6C	407.48	119.42	1359.06	398.30
7520-48Y-8C	326.71	95.75	1307.36	383.15
7520-48YE-8CE	596.58	174.84	1638.51	480.20

Power Supply Specifications

	800W AC PSU XN-ACPWR-800W-F/R	800WDC PSU XN-DCPWR-800W-F/R
Dimensions	3.15 in W x 1.57 in H x 8.11 in D (8.0 cm x 4.0 cm x 20.6 cm)	3.15 in W x 1.57 in H x 8.11 in D (8.0 cm x 4.0 cm x 20.6 cm)
Weight	1.79 lb (0.81kg)	1.85 lb (0.85kg)
Voltage Input Range	100VAC-140 VAC/200VAC-240 VAC	-48VDC to -60VDC
Line Frequency Range	50Hz– 60Hz	N/A
PSU Input Socket	IEC320 C14	Terminal Block
PSU Output Cord	IEC320 C13	N/A
Operating Conditions	0°C–55°C operation	0°C–55°C operation

Environmental

Environmental Specifications

EN/ETSI 300 019-2-1 v2.1.2 - Class 1.2 Storage
EN/ETSI 300 019-2-2 v2.1.2 - Class 2.3 Transportation
EN/ETSI 300 019-2-3 v2.1.2 - Class 3.1e Operational
EN/ETSI 300 753 (1997-10) - Acoustic Noise
ASTM D3580 Random Vibration Unpackaged 1.5 G

Environmental Compliance

EU RoHS - 2011/65/EU
EU WEEE - 2012/19/EU
EU REACH – Regulation (EC) No 1907/2006 Reporting
China RoHS - SJ/T 11363-2006
Taiwan RoHS - CNS 15663(2013.7)

Environmental Operating Conditions

Temp: 0°C to 50°C (32°F to 122°F)

Humidity: 10% to 95% relative humidity, non-condensing

Altitude: 0 to 3,000 meters (9,850 feet)

Shock (half sine) 98m/s2 (10G), 11ms, 18 shocks

Random vibration: 3Hz to 500Hz at 1.5 G rms

Packaging and Storage Specifications

Temp: -40°C to 70°C (-40°F to 158°F)

Humidity: 10% to 95% relative humidity, non-condensing

Packaged Shock (half sine): 180 m/s2 (18 G), 6 ms, 600 shocks

Packaged Vibration: 5Hz to 62Hz at velocity 5 mm/s, 62Hz to 500Hz at 0.2 G

Packaged Random Vibration: 5Hz to 20Hz at 1.0 ASD w/–3 dB/oct. from 20Hz to 200Hz

Packaged Drop Height: 14 drops minimum on sides and corners at 42 inches (<15 kg box)

Regulatory and Safety

North American ITE

UL 62368-1

UL/CuL62368-1 Listed

CAN/CSA-C22.2 No 60950-1-07 Incl. AM1 (2011) and AM2 (2014)

CAN/CSA C22.2 No. 62368-1:19

Complies with FCC 21CFR 1040.10 (U.S. Laser Safety)

CDRH Letter of Approval (US FDA Approval)

European ITE

EN 60950-1 2nd Edition

EN62368-1

EN 60825-1 Class 1 (Lasers Safety)

2014/35/EU Low Voltage Directive

International ITE

CB Report & Certificate per IEC 60950-1

CB Report & Certificate IEC 62368-1

AS/NZS 62368.1:2022 (Australia/New Zealand)

EMI/EMC Standards

North American EMC for ITE

FCC CFR 47 Part 15 Class A (USA)

ICES-003 Class A (Canada)

European EMC Standards

EN 55032 Class A

EN 55035

EN 55011

EN 61000-3-2,2014 (Harmonics)

EN 61000-3-3 2013 (Flicker)

EN 61000-6-2

EN 61000-6-4

EN 300 386 (EMC Telecommunications) 2014/30/EU EMC Directive

International EMC Certifications

CISPR 32, Class A (International Emissions) AS/NZSCISPR32

CISPR24 Class A (International Immunity)

IEC 61000-4-2/EN 61000-4-2 Electrostatic Discharge, 8 kV Contact, 15 kV Air, Criteria B

IEC 61000-4-3/EN 61000-4-3 Radiated Immunity 10V/m, Criteria A

IEC 61000-4-4/EN 61000-4-4 Transient Burst, 2 kV, Criteria B

IEC 61000-4-5/EN 61000-4-5 Surge, 2 kV L-L, 2 kV L-G, Level 3, Criteria B

IEC61000-4-6 Conducted Immunity, 0.15-80MHz, 10V/rms, 80%AM (1kHz), Criteria A

IEC/EN61000-4-11 Power Dips & Interruptions, >30%, 25 periods, Criteria C

Country Specific

VCCI Class A (Japan Emissions)

ACMA RCM (Australia Emissions)

CQC Mark (China)

KCC Mark, EMC Approval (Korea)

BSMI (Taiwan)

Anatel (Brazil)

NoM (Mexico)

EAC (Russia, Belarus, Kazakhstan)

NRCS (South Africa)

TEC (India)

IEEE 802.3 Media Access Standards

IEEE 802.3ab 1000BASE-T

IEEE 802.3ae 10GBASE-X

IEEE 802.3 10GBASE-T (up to 100m using Cat6a cabling or better)

IEE 802.3by-2016 25Gb/s Operation

IEEE 802.3ba/802.3bm 40 GBASE-X and 100 GBASE-X

Ordering Notes

Customers ordering an AC-bundled version of the 7520 Series switch receive the hardware switch along with a Base software license, integrated power supply, fan modules, and rack-mount kit.

Customers ordering a non-bundled version of the 7520 Series switch customers will only receive the hardware switch, Base software license, and rackmount kit. Customers in this case, must order Power Supply Units (PSU) and fan modules separately.

At least one Power Supply Unit (PSU) is required for 7520 operations. Additional power supplies, transceiver/optics, power cords, as well as Premier license, must be ordered separately.

Base Software and Optional Premier License

The Base software included with each 7520 unit supports most available software features. Certain features, however, require a Premier License to operate:

For Switch Engine, a Premier License is required for:

5 or more OSPF interfaces
PIM DM/PIM SSM
Anycast RP (Rendezvous Point)
MultiSource Discovery Protocol (MSDP)
IS-IS/BGP4/MBGP*
GRE Tunneling
Ethernet VPN (EVPN)

* Up to 2 BGP interfaces included in Base software

For Fabric Engine, a Premier License is required for :

Layer 3 Virtual Services Networks (VSNs)
Distributed Virtual Routing Controller
VXLAN Gateway
5 or more active OSPF interfaces
17 or more BGP peers
Insight Architecture/Integrated Application Hosting (IAH)

Power Supplies for Use with Your Switch

Each 7520 Series switch runs with two replaceable internal power supply modules that provide all of the power needed for the switch to operate. You can remove one power supply module without interrupting the switch's operation. Supported power supply configurations include two 800W AC power supply modules, two 800W DC power supply modules, or one 800W AC and one 800W DC power supply module. Power supply modules have integrated cooling fans that operate independently of the switch fans and are available with front-to-back or back-to-front airflow. The direction of the airflow in both power supply modules must be in the same direction and must also be in the same direction of the airflow in the fan modules.

Ordering Information

Part Number	Product Name	Description
7520-48XT-6C	7520-48XT Base System	Extreme 7520-48XT Switch - Ships with two empty power supply slots, six empty fan slots, one 4-post rack mount kit. Supports 48 x 1G/10G copper ports and 6 x 40G/100G fiber ports
7520-48XT-6C-AC-F	7520-48XT with front-to-back airflow	Extreme 7520-48XT Switch - Ships with two AC front-to-back airflow power supplies, six front- to-back airflow fans, one 4-post rack mount kit. Supports 48 x 1G/10G copper ports and 6 x 40G/100G fiber ports
7520-48XT-6C-AC-R	7520-48XT with back-to-front airflow	Extreme 7520-48XT Switch - Ships with two AC back-to-front airflow power supplies, six back- to-front airflow fans, one 4-post rack mount kit. Supports 48 x 1G/10G copper ports and 6 x 40G/100G fiber ports
7520-48Y-8C	7520-48Y Base System	Extreme 7520-48Y Switch with two empty power supply slots, six empty fan slots, Ships with one 4-post rack mount kit. Supports 48 x 1G/10G/25G fiber ports and 8 x 40G/100G fiber ports
7520-48YE-8CE	7520-48YE Base System	Extreme 7520-48YE Switch with two empty power supply slots, six empty fan slots, Ships with one 4-post rack mount kit. Supports 48 x 10G/25G fiber ports and 8 x 40G/100G fiber ports. Includes embedded MACsec capabilities.
7520-48Y-8C-AC-F	7520-48Y with front- to-back airflow	Extreme 7520-48Y Switch - Ships with two AC front-to-back airflow power supplies, six front- to-back airflow fans, one 4-post rack mount kit. Supports 48 x 1G/10G/25G fiber ports and 8 x 40G/100G fiber ports
7520-48YE-8CE-AC-F	7520-48YE with front-to-back airflow	Extreme 7520-48YE Switch - Ships with two AC front-to-back airflow power supplies, six front- to-back airflow fans, one 4-post rack mount kit. Supports 48 x 10G/25G fiber ports and 8 x 40G/100G fiber ports. Includes embedded MACsec capabilities.

Part Number	Product Name	Description
7520-48Y-8C-AC-R	7520-48Y with back- to-front airflow	Extreme 7520-48Y Switch - Ships with two AC back-to-front airflow power supplies, six back- to-front airflow fans, one 4-post rack mount kit. Supports 48 x 1G/10G/25G fiber ports and 8 x 40G/100G fiber ports
7520-48YE-8CE-AC-R	7520-48YE-8CE- AC-R with back-to- front airflow	Extreme 7520-48YE Switch - Ships with two AC back-to-front airflow power supplies, six back- to-front airflow fans, one 4-post rack mount kit. Supports 48 x 10G/25G fiber ports and 8 x 40G/100G fiber ports. Includes embedded MACsec capabilities.

Accessories

Part Number	Product Name	Description
XN-ACPWR-800W-F	800W AC PSU (Front-to-Back)	AC800W PSU, Front to Back Airflow for use in 7520, 7720
XN-ACPWR-800W-R	800W AC PSU (Back-to-Front)	AC800W PSU, Back to Front Airflow for use in 7520, 7720
XN-DCPWR-800W-F	800W DC PSU (Front-to-Back)	DC800W PSU, Front to Back Airflow for use in 7520, 7720
XN-DCPWR-800W-R	800W DC PSU (Back-to-Front)	DC800W PSU, Back to Front Airflow for use in 7520, 7720
XN-FAN-001-F	Fan Module (Front-to-Back)	Single fan module Front to Back Airflow (also used in X695, VSP 7400, SLX 9150, SLX 9250, 7720, 8520, and 8720)
XN-FAN-001-R	Fan Module (Back-to-Front)	Single fan module Back to Front Airflow (also used in X695, VSP 7400, SLX 9150, SLX 9250, 7720, 8520, and 8720)
XN-2P-RKMT299	Two-post rack mount kit	Two-post rack mount kit for 7520 and 7720 switches
XN-4P-RKMT298	Four-post rack mount kit	Four-post rack mount kit for 7520-48Y, 7520-48XT, and 7720 switches
XN-4P-RKMT302	Four-post rack mount kit	Four-post rack mount kit for 7520-48YE switches

Software Licenses

Part Number	Product Name	Description
7000-PRMR-LIC-P	Premier License for 7000 Series	Perpetual Premier License for Extreme 7000 series (Includes Integrated Application Hosting)
7000-MACSEC-LIC-P	MACsec License for 7000 Series	Perpetual MACsec License for Extreme 7000 series

Warranty

All 7520 Series models are covered under Extreme's Universal LLW policy. For warranty details, visit: http://www.extremenetworks.com/support/policies

Maintenance Services

Extreme's maintenance and support services with 100% in-sourced engineering experts and over 90% first-person resolution ensure efficient operation of your business-essential network. 24x7x365 phone support, advanced parts replacement, and on-site support augment your staff with experienced resources that help you mitigate critical network issues fast. Visit our ExtremeWorks Maintenance Services page for more information.

Optics/Transceivers

For a list of the optics/transceivers supported on the 7520 Series, refer to our Extreme Optics Compatibility Tool.

Power Cords

In support of Extreme Networks green initiatives, power cords are not included with the 7520 but can be ordered separately. They should be specified at time of ordering.

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Extreme Platform ONE™



Highlights

- Conversational, multimodal and agentic AI reduce manual effort by up to 90% without sacrificing human expertise and control.
- Simplified workflows turn eight clicks into one across networking, security, inventory lifecycle management, procurement and compliance efforts.
- Multi-domain, multi-layer views make the network easier to learn and manage.
- Complete access security and Extreme Fabric visualization and configuration enable end-to-end network and security automation.
- Device, inventory, subscription, and contract management workflows save time on procurement, compliance, administration, and other efforts.
- Powerful administration tools accelerate time to value and reduce time spent on management.
- An inclusive licensing program with technology, support, and updates, makes it simpler to understand and manage total cost of ownership.

Extreme Platform ONE: Secure Connectivity Made Simple

Networking and security are becoming more complex, and that complexity is slowing growth and innovation. Extreme Platform ONE™ makes secure connectivity simple. The industry's first all-in-one networking with integrated security and conversational, multimodal, and agentic AI helps customers improve efficiency, security, and productivity while reducing total cost of ownership.

Only Extreme Platform ONE's all-in-one platform approach enables customers to:

- **Reduce manual effort by up to 90%** with conversational, multimodal, and agentic AI for networking, security, procurement, compliance, and other workflows.
- **Secure and scale the network in minutes** with zero-touch network fabric and complete, pre-integrated zero trust access security.
- **Turn eight clicks into one** with multi-domain, multi-layer views, simplified workflows, and personalized experiences in a composable workspace.
- **Reduce total cost of ownership** with a subscription program that includes technology, updates, and 100% in-sourced, industry-recognized support.

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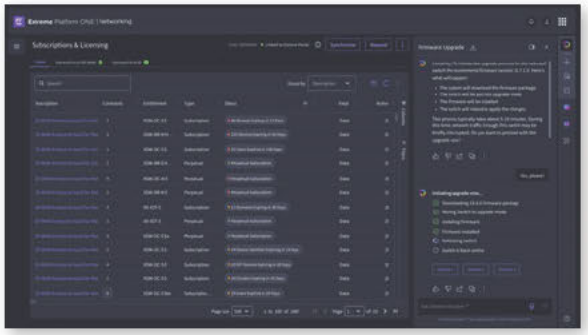
Key Capabilities and Benefits

AI for Networking: Automated, Human-Centered AI

AI has set high expectations for productivity. However, many AI solutions are siloed, reducing their value, potential, and applicability. Extreme Platform ONE's conversational, multimodal, and agentic AI capabilities help customers reduce manual effort by up to 90%. Instant answers, custom, query-based dashboards, and agentic AI workflow automation work together to augment human expertise and efficiency for networking, security, procurement, compliance, and other complex workflows.

AI Expert accelerate any workflow with instant answers across thousands of topics

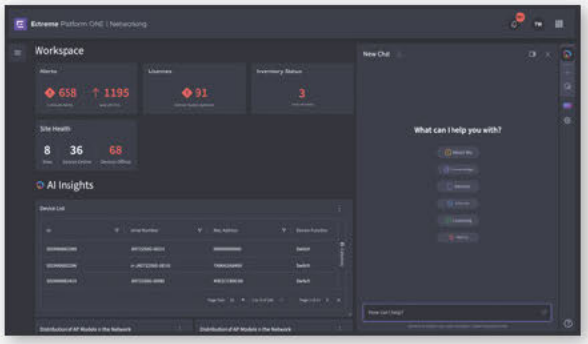
- A multilingual, conversational AI agent available 24/7 provides instant responses to questions across thousands of topics.
- Follow-up questions enable faster exploration.
- Public and proprietary data sources, such as documentation, technical articles, and network data, enrich and contextualize answers.
- Conversation history makes it simple to return to a previous conversation, even months later.
- Conversation privacy helps ensure a private opportunity to get assistance or explore questions.



Instant response across thousands of topics

AI Canvas enables data exploration and trend monitoring with real-time, custom dashboards

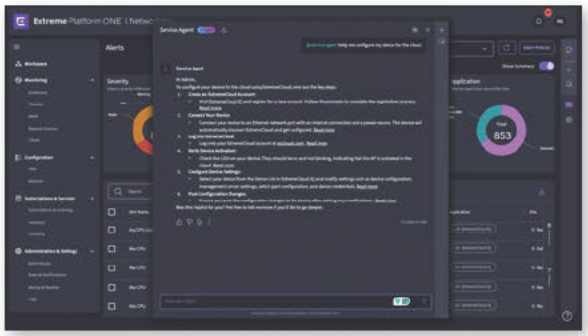
- Natural language data visualization simplifies data exploration and custom reporting and analysis.
- Custom widgets, such as such as charts, graphs, and tables, improve insights.
- Easy export of widgets to PDF or other formats make sharing insights simples and quick.
- Real-time, custom dashboards of multiple widgets make it simpler to monitor changes and trends over time.



Real-time, query-based dashboards in minutes

AI agents, powered by human expertise, improve efficiency

- AI agents save time by automating complex, manual tasks.
- Extreme's human-in-the-loop approach enables agents to operate independently based on user direction and approval.
- Service Agent, a smart, 24/7 point of contact, helps accelerate issue diagnosis and troubleshooting, reducing time to resolution.
- Streamlined evidence collection saves time with instant access to relevant logs and data.
- Efficient case creation and escalation enable a seamless hand-off to Extreme's **Global Technical Assistance Center (GTAC).***



Reduce time to resolution by up to 98%

*Case creation features are available to ExtremeWorks customers only.

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Zero Touch, Zero Trust Networking

As security needs continue to evolve, organizations are facing challenges keeping pace. A lack of pre-integration between networking and security increases complexity and cost. Extreme Platform ONE provides a set of built-in and pre-integrated security capabilities to make it simpler to deliver security connectivity, anywhere. Extreme Fabric, enhanced Wi-Fi security, and role-based access for Extreme Platform ONE are all included in a standard Extreme Platform ONE Networking subscription. Pre-integrated Universal ZTNA requires an additional subscription. These capabilities work in tandem to accelerate the adoption of zero trust security practices. Extreme Platform ONE's complete, zero trust access security makes it simpler and safer for customers to extend services to anyone, reducing risk, downtime, and manual effort all at the same time.

Extreme Fabric unifies, automates, and secures the network across campus, data center and branch

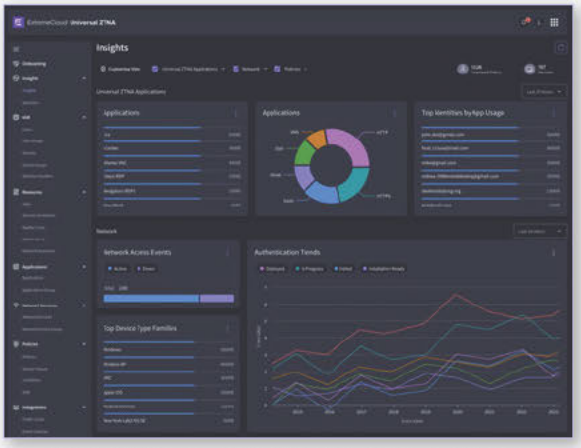
- Cloud visualization and configuration of Fabric make it simpler to monitor, configure, and troubleshoot a fabric network and its services from the cloud.
- Sub-second convergence helps enable a zero-downtime architecture, reducing cost and risk.
- Automated macro and micro-segmentation improve network security and simplify compliance.
- Stealth topology hides the core network from IP-based scanning and bad actors.
- Just-in-time services reduce the risk of back-door network access, scaling down unused services.



Automate, secure, and scale with Extreme Fabric

Complete, identity-based access security simplifies zero trust for campus, branch and remote work*

- Unified cloud network access control (NAC) and zero trust network access (ZTNA) secure the network, applications, and devices with one policy engine, reducing touchpoints and time spent.
- Guided setup and pre-integration with leading identity provider (IdP) vendors, such as Google and Microsoft, accelerate time to value.
- Automatic device configuration for IoT and end-user devices, NAC, Service Set Identifiers (SSIDs), ports, and Virtual LANs (VLANs) on universal access points (APs) and switches saves time for IT and end-users.
- Multiple encryption protocols such as RADIUS, IPsec, and WireGuard reduce incident risk and impact.
- Integration with mobile device management (MDM) solutions, such as Microsoft Intune, reduces unauthorized access risk.
- A single monitoring and reporting system simplifies management and offers rich insights into security.



Set network access and application access policy with a single engine

Built-in wireless intrusion prevention protects the network at one of its most vulnerable points

- Pre-integration with Extreme Platform ONE Networking reduces complexity and misconfiguration risk.
- Real-time detection identifies, classifies, and prevents unauthorized devices from gaining access.
- Automated countermeasures accelerate response by applying mitigation based on configured policies.

*Requires an additional subscription. See ExtremeCloud™ Universal ZTNA Ordering Information below.

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One Platform, A Thousand Gains

Organizations are struggling with complexity. Products are siloed. Integrations are expensive. Visibility is limited. Extreme Platform ONE enables customers to improve efficiency and reduce total cost of ownership with multi-domain, multi-layer views of the network, simplified workflows, and personalized experiences that turn eight clicks into one.

Deep multi-domain, multi-layer views make the network simpler to explore, monitor, and troubleshoot

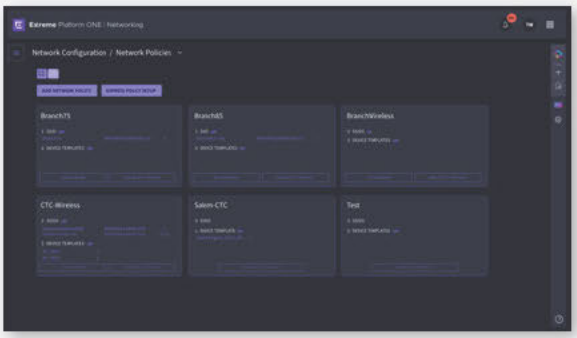
- Unified monitoring simplify and accelerate troubleshooting with real-time insight into alerts, device status, and client health.
- Geographical, logical, access, radio frequency (RF), Extreme Fabric, and service layer views for Extreme and third-party devices make the network faster to learn and simpler to manage.
- RF Maps simplify Wi-Fi design, optimization, and troubleshooting.
- Real-time alert overlays and side-by-side layer views make it faster to pinpoint faults and identify root causes.



Health, alerts, capacity, and other details, at a glance

Accelerated onboarding and zero touch Extreme Fabric save time on new services and moves, adds, and changes

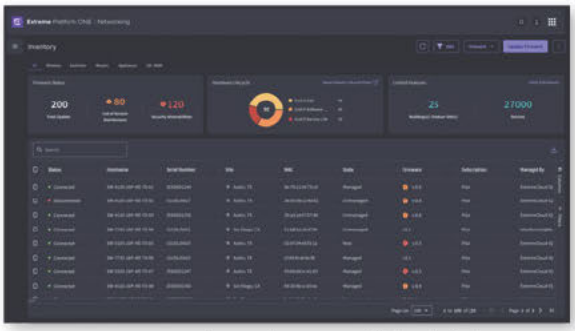
- Site configuration enables network policy across site groups, sites, buildings, and floors.
- Device onboarding makes new devices easy to claim, configure, and deploy individually or in bulk.
- Wired configuration enables administrators to configure Layer 2 and static routing.
- Wireless configuration enables administrators to configure floor plans and parameters for heat maps.
- Extreme Fabric configuration enables rapid fine-tuning of key Fabric parameters.



Quick configuration for sites, devices, and network policies

Built-in inventory, subscription, and contract management simplify financial management

- Device and inventory monitoring accelerate planning, design, configuration, and deployment.
- Proactive compliance alerts reduce risk and save time on compliance efforts.
- Subscription and contract visibility improve cost control and simplify budgeting
- Simple subscription renewals and new subscription requests take only minutes, saving time, and reducing the risk of disruption.

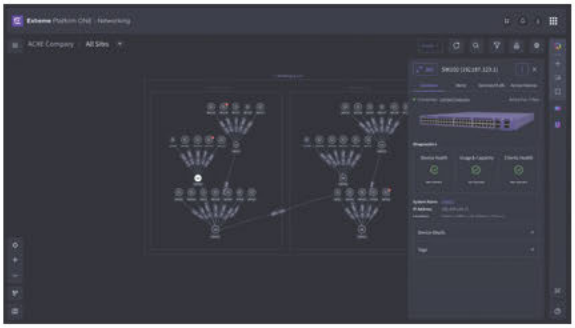


Inventory and compliance capabilities, built-in

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Industry-leading design and usability put users at the center of their experiences

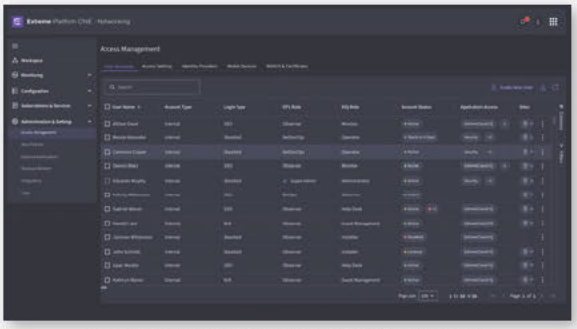
- A composable workspace with role-based access and personalized experiences make every workflow faster.
- A "two-click" design rule improves productivity, helping ensure users can quickly find and do things without needing to navigate through multiple screens.
- Device groups, tagging, search, and filter organize the network and make it simpler to find things.
- An inspector gracefully provides expanded details about a select switch, access point, link or other network objects.
- Responsive design enables users to work effectively across different devices and screen sizes.



Graceful expansion simplifies user experience

Powerful administration tools save time on access, alerts, audit logs, and more

- Access management makes it simple to set access rules for internal users and invite partners to collaborate.
- Alerts and notification policy reduce alert volume with set global and local policies with many configurations options.
- Back-up and restore makes it simple to protect a management instance with a few toggles.
- Integrations make the platform simpler to automate with API access token and data management.
- Audit logs simplify compliance efforts, change monitoring, forensics, and rollbacks when needed.



A composable workspace reduces complexity

A Simple, Inclusive Subscription Program

Owning and operating a network is more complex and costly than it needs to be. Multiple subscription programs, premium licensing requirements, and hardware that only works with a specific management subscription make it harder to optimize value. Extreme Platform ONE is as simple to buy and grow as it is to use—no need for a complex bill of materials with multiple line items and premium subscription requirements.

Extreme Platform ONE Networking subscription includes:

- Technology, such as Extreme AI, visualization, configuration, Extreme Fabric management, and more
- Support, including ExtremeWorks Technical Assistance Center (TAC) access and operating system (OS) support
- Warranty-only hardware replacement for associated devices

For example, an Extreme 4220 48 port switch with an Extreme Platform ONE Networking subscription requires only a single SKU for the hardware and a single SKU for the subscription.

Qty	SKU	Description
1	4220-48T-4X	4220 48 Port Switch 48T-4X
1	EP1-STD-TA-S-C-EW-1YR	EP1 Standard SaaS EW Support Tier A 1YR

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Extreme Platform ONE Networking is offered in four tiers in predefined or configurable term lengths. The 3- and 5-year SKUs are term locked. However, flexible terms (2, 4, 6, 7 years, etc.) can be ordered through the non-term flexible 1-year SKUs. Hardware to tier subscriptions mappings for Universal platforms are below. However, non-Universal platforms such as the X435, X460-G2, VSP7400, etc. that have not reached end-of-service-life (EOSL) are also eligible based on the class of the device.

Tier	Wireless	Wired	Term
A	All Indoor and Outdoor APs	4100, 4200, 5100,5300 Series	1 (flexible), 3, 5
B		5400 Series	1 (flexible), 3, 5
C		5500 Series	1 (flexible), 3, 5
D		5700, 7500, 7700 Series	1 (flexible), 3, 5

Extreme Platform ONE subscriptions include the following entitlements for the term of the contract

- Right-to-use (RTU) Platform ONE and Extreme AI Expert, including GTAC phone support, upgrade, and maintenance releases
- Embedded network OS support including feature and maintenance releases for managed devices (such as AP5020, AP4000, 4120, 4220, 5320, 5520, 5720 Series switches etc.).
- AI-assisted GTAC support.
- GTAC telephone support for the embedded network OS of the managed device.

Subscription Part Numbers and Descriptions

Extreme Platform ONE Subscriptions with included ExtremeWorks TAC & OS support

Part Number	Description
EP1-STD-TA-S-C-EW-1YR	Extreme Platform ONE Standard Networking Right-to-use and EW TAC OS Support for one (1) device of Tier A per year
EP1-STD-TA-S-C-EW-3YR	Extreme Platform ONE Standard Networking Right-to-use and EW TAC OS Support for one (1) device of Tier A for three (3) years
EP1-STD-TA-S-C-EW-5YR	Extreme Platform ONE Standard Networking Right-to-use and EW TAC OS Support for one (1) device of Tier A for five (5) years
EP1-STD-TB-S-C-EW-1YR	Extreme Platform ONE Standard Networking Right-to-use and EW TAC OS Support for one (1) device of Tier B per year
EP1-STD-TB-S-C-EW-3YR	Extreme Platform ONE Standard Networking Right-to-use and EW TAC OS Support for one (1) device of Tier B for three (3) years
EP1-STD-TB-S-C-EW-5YR	Extreme Platform ONE Standard Networking Right-to-use and EW TAC OS Support for one (1) device of Tier B for five (5) years
EP1-STD-TC-S-C-EW-1YR	Extreme Platform ONE Standard Networking Right-to-use and EW TAC OS Support for one (1) device of Tier C per year
EP1-STD-TC-S-C-EW-3YR	Extreme Platform ONE Standard Networking Right-to-use and EW TAC OS Support for one (1) device of Tier C for three (3) years
EP1-STD-TC-S-C-EW-5YR	Extreme Platform ONE Standard Networking Right-to-use and EW TAC OS Support for one (1) device of Tier C for five (5) years
EP1-STD-TD-S-C-EW-1YR	Extreme Platform ONE Standard Networking Right-to-use and EW TAC OS Support for one (1) device of Tier D per year
EP1-STD-TD-S-C-EW-3YR	Extreme Platform ONE Standard Networking Right-to-use and EW TAC OS Support for one (1) device of Tier D for three (3) years
EP1-STD-TD-S-C-EW-5YR	Extreme Platform ONE Standard Networking Right-to-use and EW TAC OS Support for one (1) device of Tier D for five (5) years

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Extreme Platform ONE Subscriptions with included ExtremeWorks Premier TAC & OS support

Part Number	Description
EP1-STD-TA-S-C-EWP-1YR	Extreme Platform ONE Standard Networking Right-to-use and EW Premier TAC OS Support for one (1) device of Tier A per year
EP1-STD-TA-S-C-EWP-3YR	Extreme Platform ONE Standard Networking Right-to-use and EW Premier TAC OS Support for one (1) device of Tier A for three (3) years
EP1-STD-TA-S-C-EWP-5YR	Extreme Platform ONE Standard Networking Right-to-use and EW Premier TAC OS Support for one (1) device of Tier A for five (5) years
EP1-STD-TB-S-C-EWP-1YR	Extreme Platform ONE Standard Networking Right-to-use and EW Premier TAC OS Support for one (1) device of Tier B per year
EP1-STD-TB-S-C-EWP-3YR	Extreme Platform ONE Standard Networking Right-to-use and EW Premier TAC OS Support for one (1) device of Tier B for three (3) years
EP1-STD-TB-S-C-EWP-5YR	Extreme Platform ONE Standard Networking Right-to-use and EW Premier TAC OS Support for one (1) device of Tier B for five (5) years
EP1-STD-TC-S-C-EWP-1YR	Extreme Platform ONE Standard Networking Right-to-use and EW Premier TAC OS Support for one (1) device of Tier C per year
EP1-STD-TC-S-C-EWP-3YR	Extreme Platform ONE Standard Networking Right-to-use and EW Premier TAC OS Support for one (1) device of Tier C for three (3) years
EP1-STD-TC-S-C-EWP-5YR	Extreme Platform ONE Standard Networking Right-to-use and EW Premier TAC OS Support for one (1) device of Tier C for five (5) years
EP1-STD-TD-S-C-EWP-1YR	Extreme Platform ONE Standard Networking Right-to-use and EW Premier TAC OS Support for one (1) device of Tier D per year
EP1-STD-TD-S-C-EWP-3YR	Extreme Platform ONE Standard Networking Right-to-use and EW Premier TAC OS Support for one (1) device of Tier D for three (3) years
EP1-STD-TD-S-C-EWP-5YR	Extreme Platform ONE Standard Networking Right-to-use and EW Premier TAC OS Support for one (1) device of Tier D for five (5) years

Extreme Platform ONE Subscriptions with included PartnerWorks Plus TAC & OS support

Part Number	Description
EP1-STD-TA-S-C-PWP-1YR	Extreme Platform ONE Standard Networking Right-to-use and PartnerWorks Plus (PWP) TAC OS Support for one (1) device of Tier A per year
EP1-STD-TA-S-C-PWP-3YR	Extreme Platform ONE Standard Networking Right-to-use and PartnerWorks Plus (PWP) TAC OS Support for one (1) device of Tier A for three (3) years
EP1-STD-TA-S-C-PWP-5YR	Extreme Platform ONE Standard Networking Right-to-use and PartnerWorks Plus (PWP) TAC OS Support for one (1) device of Tier A for five (5) years
EP1-STD-TB-S-C-PWP-1YR	Extreme Platform ONE Standard Networking Right-to-use and PartnerWorks Plus (PWP) TAC OS Support for one (1) device of Tier B per year
EP1-STD-TB-S-C-PWP-3YR	Extreme Platform ONE Standard Networking Right-to-use and PartnerWorks Plus (PWP) TAC OS Support for one (1) device of Tier B for three (3) years
EP1-STD-TB-S-C-PWP-5YR	Extreme Platform ONE Standard Networking Right-to-use and PartnerWorks Plus (PWP) TAC OS Support for one (1) device of Tier B for five (5) years
EP1-STD-TC-S-C-PWP-1YR	Extreme Platform ONE Standard Networking Right-to-use and PartnerWorks Plus (PWP) TAC OS Support for one (1) device of Tier C per year
EP1-STD-TC-S-C-PWP-3YR	Extreme Platform ONE Standard Networking Right-to-use and PartnerWorks Plus (PWP) TAC OS Support for one (1) device of Tier C for three (3) years
EP1-STD-TC-S-C-PWP-5YR	Extreme Platform ONE Standard Networking Right-to-use and PartnerWorks Plus (PWP) TAC OS Support for one (1) device of Tier C for five (5) years
EP1-STD-TD-S-C-PWP-1YR	Extreme Platform ONE Standard Networking Right-to-use and PartnerWorks Plus (PWP) TAC OS Support for one (1) device of Tier D per year
EP1-STD-TD-S-C-PWP-3YR	Extreme Platform ONE Standard Networking Right-to-use and PartnerWorks Plus (PWP) TAC OS Support for one (1) device of Tier D for three (3) years
EP1-STD-TD-S-C-PWP-5YR	Extreme Platform ONE Standard Networking Right-to-use and PartnerWorks Plus (PWP) TAC OS Support for one (1) device of Tier D for five (5) years

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Services

Along with the Extreme Platform ONE Networking subscriptions, there are new and updated hardware replacement services. Extreme Networks' industry-leading GTAC support and access to network OS updates are included with an Extreme Platform ONE subscription. This entitles full technical support for the Extreme hardware product consuming a Platform ONE subscription.

It is not necessary to purchase ExtremeWorks (97000) or PartnerWorks Plus (95600) TAC&OS support for a hardware product that is onboarded to Extreme Platform ONE. This is also the case for our ExtremeWorks Premier customers when using the Premier version of the Platform ONE subscription—no additional service offer is necessary for entitlement to Premier support on the hardware device consuming the Premier Platform ONE subscription.

For hardware replacement and onsite maintenance services, there are specific service SKUs that can be used in conjunction with the TAC&OS entitlement from a Platform ONE subscription. These are Advanced Hardware Replacement, RMA-Only offers and are only valid for Extreme hardware that is also consuming an Extreme Platform ONE subscription. The AHR-RMA-Only offer types are listed in the table below.

Service SKU Prefix	Service Offer Description
97304	EW NBD AHR RMA Only
97307	EW 4HR AHR RMA Only
97308	EW 4HR ONSITE RMA Only
97311	EW NBD ONSITE RMA Only
94304	PW NBD AHR RMA Only
94307	PW 4HR AHR RMA Only
94308	PW 4HR ONSITE RMA Only
94311	PW NBD ONSITE RMA Only
94604	PWP NBD AHR RMA Only

Universal ZTNA has been integrated into Extreme Platform ONE and is now available with an additional subscription. The subscription is optional and not required for Extreme Platform ONE except where noted earlier in this data sheet. ExtremeCloud Universal ZTNA provides secure application access control for private and IaaS applications from anywhere, and secure network access for both wired and wireless networks and resources when on-site.

ExtremeCloud™ Universal ZTNA Ordering Information

Extreme Networks provides comprehensive service offerings that range from professional services to design, deploy, and optimize customer networks, and customized technical training, to service and support tailored to individual customer needs. Please contact your Extreme Networks account executive for more information about Extreme Networks' service and support.

Tiers	SKU	SKU Description
ExtremeCloud Universal ZTNA Secure Tier Subscription	XC-SUI-S-C-EW	ExtremeCloud Secure Tier, includes Network Access Control and RADIUS as a Service, minimum of 50 qty required for initial order, SaaS Subscription and EW SaaS Support per user identity, per year
ExtremeCloud Universal ZTNA Secure Tier Subscription	XC-SUI-S-C-PWP	ExtremeCloud Secure Tier, includes Network Access Control and RADIUS as a Service, minimum of 50 qty required for initial order, SaaS Subscription and PWP SaaS Support per user identity, per year
ExtremeCloud Universal ZTNA Secure Plus Tier Subscription	XC-SPUI-S-C-EW	ExtremeCloud Secure Plus Tier, includes Universal ZTNA, minimum of 50 qty required for initial order, SaaS Subscription and EW SaaS Support per user identity, per year
ExtremeCloud Universal ZTNA Secure Plus Tier Subscription	XC-SPUI-S-C-PWP	ExtremeCloud Secure Plus Tier, includes Universal ZTNA, minimum of 50 qty required for initial order, SaaS Subscription and PWP SaaS Support per user identity, per year

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Additional Information

For additional technical information on Extreme Platform ONE, please visit extremenetworks.com/platform-one.

Additional resources available include:

- The Extreme Platform ONE Webinar series
- IDC White Paper: The Era of Connectivity Platforms: Reimagining Networking Across the Enterprise
- Customer Case Study: West Suffolk NHS Trust Foundation Upgrades to Platform ONE in 47 minutes
- Futuriom White Paper: Delivering ROI with Extreme Fabric, Views from the Field
- Extreme Universal Wired and Wireless Access Hardware Catalog
- Universal ZTNA Web Page
- Univeral ZTNA Data Sheet

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Industrial Ethernet Switches

Highlights

- Ruggedized switches that support operations under harsh industrial conditions and extended temperatures from -40°C to 75°C
- Available in several models that offer DIN Rail, Wall Mount and Rack Mount options
- Ruggedized IP30 enclosure for DIN rail mounted switches
- Fanless operation on both DIN Rail and Rack Mount switches
- Flexible PoE support with IEEE 802.3af, 802.3at and 802.3bt offering up to 90W PoE on select models
- Dual DC power input supported by all switch models
- Full wire speed Layer 2 with highly Resilient LACP, Spanning tree STP, RSTP & MSTP, fast Ring fail-over and G.8032 ERPS protection options
- Integrated Fabric Attach capability for secure, automated connection to Extreme Fabric Connect services
- CLI and web-based configuration support
- ExtremeCloud IQ Site Engine based monitoring



Industrial Networking

Extreme Industrial Switches are a family of ruggedized Layer 2 switches designed to operate under harsh environments and extended temperature conditions. They provide continuous uptime, manageability, and operational efficiency. With flexible PoE options of IEEE 802.3af, 802.3at and 802.3bt supporting up to 90W PoE per port, each switch offers the performance needed for today's power-hungry surveillance devices and WLAN access points.

Extreme Industrial Switches are an excellent choice for industrial environments, including intelligent transportation systems, utilities, and smart cities. Full redundant ring technology creates fault- tolerant networks with high availability based on industry standard technologies.

Extreme Industrial Switches can automatically connect to a Fabric Connect network via the Fabric Attach software-based feature which enables the switches to be quickly mapped as endpoints within a virtualized Fabric Connect service.

Intelligent and Resilient Layer 2 Services

ISW switches provide intelligent Layer 2 switching including Spanning Tree (STP, RSTP, MSTP), resilient LACP and advanced Ethernet Ring Protection protocols. They support multiple ring topologies such as Single/Dual Ring along with Dual Homing and Balancing Chain capabilities, enabling highly flexible and resilient deployment options. Having a reliable network is very important to Ethernet applications, especially in an Industrial domain. ISW-Series Managed Industrial Ethernet Switches provide fast failover ring protection enabling sub-second convergence, ensuring seamless network operation in the event of a link loss or a network device error.

Fabric Attach

Fabric Attach capability on the ISW Series helps automate the connection to Extreme's campus-based Fabric Connect solution. Fabric Attach provides zero-touch edge provisioning and allows ISW switches to take advantage of the virtualized services and inherent security capabilities of the Extreme Fabric Connect infrastructure.

Flexible PoE

The ISW Series offers models that include standards-based IEEE 802.3af, 802.3at and up to IEEE 802.3bt on select models, enabling flexible 15W/30W/60W/90W of PoE (Power over Ethernet) capability per port. PoE eliminates the need for additional electrical cabling and circuits otherwise needed to power Industrial IoT devices or wireless APs.

Quality of Service

QoS (Quality of Service) features allow you to allocate network resources to mission-critical applications at the expense of applications that are less sensitive to such factors as time delays or network congestion. You can configure your network to prioritize specific types of traffic, ensuring that each type receives the appropriate QoS level. The ISW switches can be configured to have 8 output Class of Service (CoS) queues per port and support Strict Priority with Weighted Round Robin scheduling.

Security

Edge Security is important when connecting 3rd party devices and hosts to the switch. ISW series supports both MAC authentication and 802.1X EAP authentication mechanisms on a per port basis. ISW switches support both RADIUS and TACACS+ for access control.

ACL (Access Control List) function supports access control security for MAC address, IP address, Layer 4 Port, and Type of Service. Each has five actions: Deny, Permit, Queue Mapping, CoS (Class of Service) Marking, and Copy Frame. You can set the default ACL rule to Permit or Deny.

External Interfaces

Part Number	Product Description	Interfaces
16801	ISW 4-10/100P, 2-10/100T, 2-SFP	4 x 10/100BASE-T PoE+ ports 802.3at (30W) ports 2 x 10/100BASE-T ports • Full / Half Duplex (autosensing) 2 x 100/1000BASE-X SFP uplink ports 1 x serial console Port (RJ45) Dual DC power input DIN rail mount
16802	ISW 8-10/100P, 4-SFP	8 x 10/100BASE-T PoE+ ports 802.3at (30W) ports 4 x 100/1000BASE-X SFP uplink ports 1 x serial console port (RJ45) Dual DC power input DIN rail mount
16803	ISW 4GbP, 2GbT, 2-SFP	2 x 10/100/1000BASE-T ports • Full / Half Duplex (autosensing) 4 x 10/100/1000BASE-T PoE+ ports 802.3at (30W) ports 2 x 100/1000BASE-X SFP uplink ports 1 x serial console Port (RJ45) Dual DC power input DIN rail mount
16804	ISW 8 GbP, 4-SFP	8 x 10/100/1000BASE-T PoE+ ports 802.3at (30W) ports 4 x 100/1000BASE-X SFP uplink ports 1 x Serial Console Port (RJ45) Dual DC power input DIN rail mount
ISW-4W-4WS-4X	ISW-12 802.3bt 4GbP 4 Combo 4 SFP+	4 x 10/100/1000BASE-T Hi PoE+ ports 802.3bt (90W) ports 4 x 10/100/1000BASE-T Hi PoE+ ports 802.3bt (90W) ports shared with 4 x 100/1000BASE-X SFP ports 4 x 100/1000/10GBASE-X SFP+ uplink ports 1 x serial console port (RJ45) 1 x USB 2.0 Dual DC power input DIN rail mount
ISW-24W-4X	ISW-28 802.3bt 24GbP 4 SFP+ 1RU	24 x 10/100/1000BASE-T Hi PoE+ ports 802.3bt (90W) 4 x 1000/10GBASE-X SFP+ uplink ports 1 x Serial Console Port (RJ45) 1 x 10/100/1000BASE-T out-of-band management port 1 x USB 2.0 Dual DC power input Rack mount

Switch Technical Specifications

Specifications	16801, 16802, 16803, 16804	ISW-4W-4WS-4X	ISW-24W-4X
Operating Temperature	-40°C to +75°C	-40°C to +75°C	-40°C to +75°C
Mounting	DIN Rail, Wall Mount	DIN Rail, Wall Mount	Rack Mount*
Power Supply	Dual DC Input**, External PSU	Dual DC Input**, External PSU	Dual DC Input**, External PSU
Rated Input	12-56VDC (46-56V for IEEE 802.3af/at)	46-57VDC, max. 7.5A (52-57V for IEEE 802.3bt)	46-57VDC, max. 15A (52-57V for IEEE 802.3bt)
Qualified PSUs***	240W (16807) 480W (16920)	240W (16807) 480W (16920) 960W (ISW-AC-DC-PS-960W)	240W (16807) 480W (16920) 960W (ISW-AC-DC-PS-960W)
Fans	Fanless	Fanless	Fanless

* Refer to Hardware Install Guide for required space clearances for installing rack mounted switch

** Dual DC input offers power supply redundancy only and cannot be used for additive PoE power

*** ISW switches can also be powered by direct DC input available at deployment site, which match the rated input of the switches

Power Supply Technical Specifications

Specifications	16807	16920	ISW-AC-DC-PS-960W
Operating Temperature	-25°C to +70°C	-25°C to +70°C	-30°C to +70°C
Mounting	DIN Rail	DIN Rail	DIN Rail
Rated Power	240W	480W	960W
Rated Input	100-240VAC, 50/60Hz, 2.6A	100-240VAC, 50/60Hz, 5A	200-240VAC, 50/60Hz, 6A
Rated Output	48VDC, 5A	48VDC, 10A	48 to 55Vdc (Voltage Adjustable), 20A
Derating	> 60°C de-rate power by 2.5%/°C	> 55 °C de-rate power by 1.33%/°C (100VAC) > 60 °C de-rate power by 2%/°C (230VAC)	> 50°C de-rate power by 2%/°C
Derated power @ 70°C	180W	384W	576

* Same type PSUs must be used for redundancy

Note: It is recommended that the power supply output voltage be adjusted to 54V for best PoE performance.

Dimensions

Part Number	Product Description	Dimensions (WxHxD) millimeters (mm)	Dimensions (WxHxD) inches (in.)
16801	ISW 4-10/100P, 2-10/100T, 2-SFP	77 x 154 x 128	3.0 x 6.0 x 5.0
16802	ISW 8-10/100P, 4-SFP	77 x 154 x 128	3.0 x 6.0 x 5.0
16803	ISW 4GbP, 2GbT, 2-SFP	77 x 154 x 128	3.0 x 6.0 x 5.0
16804	ISW 8 GbP, 4-SFP	77 x 154 x 128	3.0 x 6.0 x 5.0
ISW-4W-4WS-4X	ISW-12 802.3bt 4 GbP 4 Combo 4 SFP+	86 x 164 x 132	3.39 x 6.46 x 5.20

Part Number	Product Description	Dimensions (WxHxD) millimeters (mm)	Dimensions (WxHxD) inches (in.)
ISW-24W-4X	ISW-28 802.3bt 24GbP 4 SFP+ 1RU	440 x 43.5 x 381	17.34 x 1.71 x 15.01
16807	ISAC-DS PS 240W	63 x 125.2 x 113.5	2.48 x 4.92 x 4.46
16920	ISAC-DS PS 480W	85.5 x 125.2 x 128.5	3.36 x 4.93 x 5.06
ISW-AC-DC-PS-960W	ISW AC-DC PS 960W DIN Rail	110 x 125.2 x 150	4.33 x 4.93 x 5.91

Weights

Part Number	Product Description	Weight (kg)	Weight (oz)
16801	ISW 4-10/100P, 2-10/100T, 2-SFP	1.38	48.68
16802	ISW 8-10/100P, 4-SFP	1.44	50.79
16803	ISW 4GbP, 2GbT, 2-SFP	1.38	48.68
16804	ISW 8GbP, 4-SFP	1.44	50.79
ISW-4W-4WS-4X	ISW-12 802.3bt 4GbP 4 Combo 4 SFP+	1.9	67.02
ISW-24W-4X	ISW-28 802.3bt 24GbP 4 SFP+ 1RU	5.7	201.06

Power Consumption

Part Number	Product Description	Minimum Power Consumption (W)*	Minimum Heat Dissipation (BTU/hr)	Maximum Power Consumption (W)**	Maximum Heat Dissipation (BTU/hr)
16801	ISW 4-10/100P, 2-10/100T, 2-SFP	15	51	142	75
16802	ISW 8-10/100P, 4-SFP	15	51	265	86
16803	ISW 4GbP, 2GbT, 2-SFP	15	51	142	75
16804	ISW 8GbP, 4-SFP	15	51	265	86
ISW-4W-4WS-4X	ISW-12 802.3bt 4GbP 4 Combo 4 SFP+	31	106	397***	127
ISW-24W-4X	ISW-28 802.3bt 24GbP 4 SFP+ 1RU	40	136	777***	195

* Without PoE PD loading

** Includes PoE load on all ports

*** Includes the power consumption by SFP/SFP+ optics at 1.5W per port

PoE Budget*

Part Number	Product Description	PoE Budget with 240W PSU	PoE Budget with 480W PSU	PoE Budget with 960W PSU
16801	ISW 4-10/100P, 2-10/100T, 2-SFP	120W	120W	not supported
16802	ISW 8-10/100P, 4-SFP	177W	240W	not supported
16803	ISW 4GbP, 2GbT, 2-SFP	120W	120W	not supported
16804	ISW 8GbP, 4-SFP	177W	240W	not supported
ISW-4W-4WS-4X	ISW-12 802.3bt 4GbP 4 Combo 4 SFP+	161W	353W	360W
ISW-24W-4X	ISW-28 802.3bt 24GbP 4 SFP+ 1RU	152W	344W	720W**

* The table shows PoE budgets on a per PSU basis assuming 20% derating.

** Max PoE load of 240W per group of 8 ports. Refer to the Hardware Installation Guide for more details.

Performance and Scale

Part Number	Product Description	Port Counts							Aggregate Bandwidth	Forwarding Rate
		10/100 Base-T	10/100 Base-T PoE+	10/100/1000 Base-T	10/100/1000 Base-T PoE+	10/100/1000 Base-T (802.3bt Hi-PoE)	1000Base-X SFP	10GBase-X SFP+		
16801	ISW4-10/100P, 2-10/100T, 2-SFP	2	4				2		5.2Gbps	3.87Mpps
16802	ISW 8-10/100P, 4-SFP		8				4		9.6Gbps	7.14Mpps
16803	ISW 4GbP, 2GbT, 2-SFP			2	4		2		16Gbps	11.90Mpps
16804	ISW8 GbP, 4-SFP				8		4		24 Gbs	17.85Mpps
ISW-4W-4WS-4X	ISW-12 802.3bt 4GbP 4 Combo 4 SFP+					4+[4]	[or 4]	4	96Gbps	71.4Mpps
ISW-24W-4X	ISW-28 802.3bt 24 GbP4 SFP+ 1RU					24		4	128Gbs	95.2Mpps

Software Scaling Values

Feature Scaling	16801, 16802, 16803, 16804	ISW-4W-4WS-4X	ISW-24W-4X
VLANs	4K	4K	2K
VLAN IDs	1-4095	1-4094	1-4094
MAC Table	8K	32K	32K
ARP Table	1K	4K	2K

Feature Scaling	16801, 16802, 16803, 16804	ISW-4W-4WS-4X	ISW-24W-4X
IPv4 Route Table	32	128	64
IP Interfaces	8	128	20
Access Control Entries	256	512	256
IGMP Groups	1024	1024	1024
Port Mirroring Groups	1	5	7

Software Features

L2 and Multicast

Flow Control IEEE 802.3x (Full Duplex) and Back-Pressure (Half Duplex)

Protocol-based VLANS and Port-based VLANs; MAC-based VLANs; IP Subnet-based VLANs*

IEEE 802.1Q tag-based VLANs

IEEE 802.1ad Double Tagging (Q in Q)

IGMP v1, v2, v3 with up to 1000 multicast groups

IGMP snooping and querying

Immediate leave and leave proxy

Throttling and filtering

IEEE 802.1ab Link layer Discovery Protocol (LLDP)

* MAC and subnet VLAN are not supported in the ISW-24W-4X model.

Network Redundancy

Fast Failover Ring Protection with single and multiple rings, ring coupling, dual homing and chain modes

IEEE 802.1D STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP

Static trunk or Dynamic via LACP (Link Aggregation Control Protocol)

ITU G.8032 Ethernet Ring Protection Switching (ERPS)

Traffic Management and QOS

Priority - IEEE 802.1p QoS

Queues per port - 8

Scheduling - Strict, Weighted Round Robin

Port-based shaping

Security

Port Security — IP and MAC-based access control, IEEE 802.1X authentication Network Access Control, RADIUS, and TACACS+ AAA (Authentication, Accounting and Authorization)

Storm Control — Multicast/Broadcast/Flooding Storm Control

Management

CLI

GUI

SNMP v1, v2c, v3

Telnet

Dual Stack IPv4/ IPv6 for management

Management Security- HTTPs, SSH, RADIUS client for management

FTP/sFTP - Configuration Import/Export, Firmware Upgrade

SYSLOG

Per Port Mirroring

Ethernet Copper Diagnostics

Digital Diagnostics for SFP/SFP+ ports

DHCP- Client, Server, Relay, Snooping, Option 82

NTP

PoE scheduling, power control, PoE PD power consumption

Supported MIBs

Standard MIBs

RFC 1213 MIB II

RFC 1215 A Convention for Defining Traps for Use with the SNMP

RFC 2613 SMON MIB: VLAN statistics and port copy

RFC 2674 VLAN MIB

RFC 2819 RMON (Group 1, 2, 3, and 9)

RFC 2863 Interface Group MIB using SMI v2

RFC 3411 SNMP Management Frameworks

RFC 3414 User-based Security Model for SNMPv3

RFC 3415 View-based Access Control Model for SNMP

RFC 3635 Ethernet -like MIB

RFC 3636 802.3 Medium Attachment Unit s (MAUs) MIB

RFC 4133 Entity MIB v3

RFC 4188 Bridge MIB

RFC 4292 IP Forwarding Table MIB

RFC 4293 Management Information Base for the Internet Protocol (IP)

RFC 4668 RADIUS Authentication Client MIB

RFC 4670 RADIUS Accounting MIB

RFC 5519 Multicast Group Membership Discovery MIB

IEEE 802.1MSTP MIB

IEEE 802.1AB LLDP MIB (LLDP MIB included in clause of standard)

IEEE 802.1X MIB (PAE MIB included in clause of standard)

IEEE 80 2.1Q Bridge MIB 2008

IEEE 802.3ad MIB (LACP MIB included in clause of standard)

Private MIBs*

Access Management MIB

ACL MIB

AGGR MIB
ARP Inspection MIB
Authentication MIB
Daylight Saving MIB
DDMI MIB
DHCP6 Client MIB
DHCP Relay MIB
DHCP Server MIB
DHCP Snooping MIB
DNS MIB
EEE MIB
ERPS MIB
Firmware MIB
GVRP MIB
HTTPS MIB
ICFG MIB
ICMP MVR MIB
ICMP Profile MIB
ICMP Snooping
IP MIB
JSON RPC Notification MIB
LACP MIB
LLDP MIB
Loop Protection MIB
MAC MIB
MEP MIB
MSTP MIB
NAS MIB
NTP MIB
POE MIB
Port MIB
Privilege MIB
PSEC MIB
QOS MIB
SMI MIB
SNMP MIB
SSH MIB
SYSLOG MIB
System Utilities MIB
Textual Convention MIB
Users MIB
VLAN MIB
Voice VLAN MIB

*Private MIB support varies based on switch model.

Environmental Specifications

Operating Temperature Range
-40°C to +75°C (cold startup at -40°C)

Storage Temperature Range
-40°C to +85°C

Humidity
5% to 95% relative humidity, non-condensing

Vibration, Shock and Freefall Certifications
IEC 60068-2-6 (Vibration)
IEC 60068-2-27 (Shock)
IEC 60068-2-32 (Freefall)

Transportation
NEMA TS 2-2016

Railway
EN50121-1-2017
EN50121-4-2016

Regulatory and Safety

North American ITE

UL 60950-1
UL/CuL 62368-1 Listed
CSA 22.2 No. 60950-1 2nd edition 2014 (Canada)
Complies with FCC 21CFR 1040.10 (U.S. Laser Safety)

European ITE

EN 62368-1
EN 60825-1Class 1 (Lasers Safety)
2014/35/ EU Low Voltage Directive

International ITE

CB Report & Certificate per IEC 60950-1
CB Report & Certificate IEC 62368-1
AS/NZS 60950-1 (Australia /New Zealand)

EMI/EMC Standards

North American EMC for ITE

FCC CFR 47 part 15 Class A (USA)
ICES-003 Class A (Canada)

European EMC Standards

EN 55032 Class A
EN 55035
EN 55011
EN 61000-3-2,2014 (Harmonics)
EN 61000-3-3 2013 (Flicker)
EN 300 386 (EMC Telecommunications)
2014/30/EU EMC Directive

International EMC Certifications

CISPR 32, Class A (International Emissions)
AS/NZS CISPR32
CISPR 24 Class A (International Immunity)
IEC 61000-4-2 / EN 61000-4-2 Electrostatic Discharge, 6kV Contact (part# 16801-16804), 8kV Contact (ISW-4W-4WS-4X and ISW-24W-4X), 8kV Air (part# 16801-16804), 15kV Air (ISW-4W-4WS-4X and ISW-24W-4X) , Criteria B
IEC 61000-4-3 /EN 61000-4-3 Radiated Immunity 10V/m, Criteria A
IEC 61000-4-4 / EN 61000-4-4 Transient Burst, 1 kV (part# 16801-16804), Criteria B
IEC 61000-4-5 /EN 61000-4-5 Surge, 2 kV L-L, 2 kV L-G, Level 3, Criteria B
IEC 61000-4-6 Conducted Immunity, 0.15-80 MHz, 10V/rms, 80%AM (1kHz), Criteria A
IEC/EN 61000-4-11 Power Dips & Interruptions, >30%, 25 periods, Criteria C

Country-Specific

ACMA RCM (Australia Emissions)
KCC Mark, EMC Approval (Korea)
BSMI (Taiwan)
Anatel (Brazil)
EAC (Russia, Belarus, Kazakhstan)

RoHS and WEEE

RoHS (Pb free) and WEEE compliant

MTBF

>25 years

Ordering Information

Part Number	Product Description	Product Description Details
16801	ISW 4-10/100P, 2-10/100T, 2-SFP	(8-Port model): 4-Port 30W PoE+ 10/100 2-Port 10/100 w/2-Port SFP dual DC power inputs, fanless
16802	ISW 8-10/100P, 4-SFP	(12-Port model): 8-Port 30W PoE+ 10/100 w/ 4-Port SFP dual DC power inputs, fanless
16803	ISW 4GbP, 2GbT, 2-SFP	(8-Port model): 4-Port PoE+ Gigabit, 2-Port Gigabit w/ 2-Port SFP / dual DC power inputs, fanless
16804	ISW 8GbP, 4-SFP	(12-Port model): 8-Port 30W PoE+ Gigabit w/ 4-Port SFP / dual DC power inputs, fanless
ISW-4W-4WS-4X	ISW-12 802.3bt 4GbP 4 Combo 4 SFP+	(12-Port model): 4 10/100/1000Base-T 90W 802.3bt ports, 4 combo ports supporting either 4 10/100/1000Base-T 90W 802.3bt OR 4 1000Base-X (SFP), plus 4 10GBase-X SFP+ ports dual DC power inputs, fanless
ISW-24W-4X	ISW-28 802.3bt 24GbP 4 SFP+ 1RU	(28-Port Model): ISW Industrial Ethernet Switch 24 10/100/1000BASE-T 90W 802.3bt PoE ports, plus 4 10GBASE-X SFP+ ports dual DC power inputs, fanless, 1RU Note:This model does not support DIN Rail or Wall Mount options. It is a 1RU rack-mountable unit
16807	ISAC-DC PS 240W	ISAC-DC Power Supply 240W Output DIN Rail -25°C - 70°C
16920	ISAC-DC PS 480W	ISAC-DC Power Supply 480W Output DIN Rail -25°C - 70°C
ISW-AC-DC-PS-960W	ISW AC-DC PS 960W DIN Rail	ISW AC-DC Power Supply 960W Output DIN Rail -30°C – 70°C

Warranty

All Industrial Switches and associated Power Supply Units are covered under Extreme Networks' product warranty policy. Universal switches are covered for a period of 5 years and Power Supply Units for a period of 1 year. For warranty details, visit: http://www.extremenetworks.com/support/policies

Maintenance Services

Extreme's maintenance and support services with 100% in-sourced engineering experts and over 90% first-person resolution ensure efficient operation of your business- essential network. 24x7x365 phone support, advanced parts replacement, and on-site support augment your staff with experienced resources that help you mitigate critical network issues fast. Visit Extreme Maintenance Services for more information.

Optics/Transceivers

For higher temperature operations, industrial grade optics will be required. For a list of the optics/transceivers supported on the Industrial Switch hardware, refer to our Extreme Optics Compatibility Tool at https://optics.extremenetworks.com

Power Considerations

Industrial Switches and PSUs require field wiring and must be installed in accordance with local electrical codes by a licensed electrician. Please refer to the Safety and Installation Guide manual for more detailed information

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ExtremeControl

Highlights

Access Security

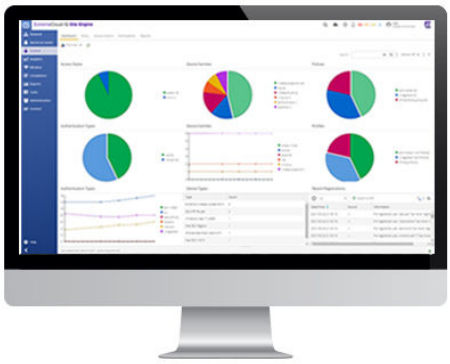
- Role-based network access control for all devices including third party networking devices
- Secure guest access and BYOD onboarding
- Integration with third party solutions such as NGFW, SIEM, CMDB, internet security and EMM/MDM
- Secure IoT network access

Operational Efficiency

- Automatic performance alerting
- Single screen for management, policies, access control, and application analytics
- Accelerated troubleshooting via separation of network from application issues

Business Aligned

- Context-driven, consistent policies from edge to data center
- Network access prevention for unauthorized users and compromised endpoints
- Securely enabled critical initiatives such as BYOD and IoT



Keep the network edge secure with end-point security.

ExtremeControl for ExtremeCloud IQ - Site Engine

With most data breaches starting at endpoints, granular control is needed over users and IoT devices and consistent policies across the entire network into multicloud. With ExtremeControl™, an application available as part of ExtremeCloud™ IQ – Site Engine[1],users have centralized in-depth visibility and control over all endpoints across their network through one simple, flexible, and easy to consume dashboard.

ExtremeControl securely enables BYOD and IoT to protect the network against external threats. It provides central management and the ability to define granular policies to meet compliance obligations, locate, authenticate, and apply targeted policies to users and devices.

ExtremeControl is integrated with major enterprise platforms including solutions for network security, enterprise mobility management, analytics, cloud, and data center. In addition, it offers an open northbound API for customized integrations to key enterprise platforms.

[1] ExtremeCloud IQ – Site Engine extends Extreme's cloud management solution to third party networking devices and non-cloud native devices. It also provides the flexibility to manage the network in the cloud and/or local (on-premises).

Granular Policy Control

ExtremeControl enables the application of granular controls over users and endpoints allowed on the network. Users can enable secure BYOD, guest access, and IoT by rolling out real-time policies based on the security posture of devices.

ExtremeControl matches endpoints with attributes such as user, time, location, vulnerability, or access type to create an all-encompassing contextual identity. Role-based identities follow a user, regardless of where or howthey connect to the network. They can be used to enforce highly secure access policies to prevent unauthorized users and compromised endpoints from accessing the network.

Administrators can centrally manage security access profiles which may encompass a combination of VLAN, Service Identifier (L2VSNs / L3VSNs), L2-L7 ACL, and L2-L7 QoS rules as they pertain to the type of network, fabric, or non-fabric. ExtremeControl also permits the automatic distribution of security access profiles to network devices and Wi-Fi controllers, as well as converts security access profiles to downloadable Access Control Lists (dACLs) for installation on switches and routers. In addition, security access profiles can be assigned to a network device port or dynamically based on user or device authentication as downloadable or dynamic ACLs.

Advanced Reporting

ExtremeControl makes it easy to monitor issues on the network — all on one simple-to-read dashboard. It sends advanced, customizable reports and alerts about the authentication, guest access, onboarding, device profiles and authentication, as well as end- system health. When rolling out large projects, reduce risk by testing new policies and using passive policies for what-if scenarios prior to enforcement. ExtremeControl identifies threats by profiling and tracking users and devices, as well as monitoring the health and compliance of devices before and after access. ExtremeControl can also accommodate policy audits provided by third party integrated MDM/EMM solutions to either ensure defined policies are working or to enforce those policies. It can also provide hit reports and the status regarding the number of non-compliant and/or decommissioned devices that have restricted network access with additional context regarding where, when, and how. ExtremeControl enables compliance auditors and security teams with the relevant data they need to make informed decisions regarding their network access policies.

Ecosystem Integration

ExtremeControl is integrated with Extreme Networks' ecosystem of partners to expand network security and threat response. For example, ExtremeControl is integrated with next-generation firewall solutions and can orchestrate endpoint isolation and remediation based on the alerts received. It shares contextual information such as users, IP address, and location for powerful policy enforcement at perimeter firewalls. Policies based on ID-IP mapping follow users. ExtremeControl also offers third-party policy support, via user-based ACLs, ensuring granular control of the entire network. To prevent the accessing of a client's network from non-compliant and un-enrolled devices the integration with existing EMM/MDM partners, such as VMware Workspace ONE UEM (Airwatch), Citrix, and MobileIron is simplified.

Specifications

Virtual Appliance Options

The ExtremeControl for ExtremeCloud IQ – Site Engine can alsobe installed as a virtual appliance that customers can download at purchase. The ExtremeControl virtual engines must be deployed on a VMWare or Hyper-V server.

- The VMWare Management Center virtual engines are packaged in the .OVA file format (defined by VMware).
- The Hyper-V Management Center virtual engines are packaged in the .ZIP file format.

Refer to the ReleaseNotes for information on Virtual Appliance scalability.

ExtremeControl Supported End-System Browsers

The following lists the supported desktop and mobile end-system browsers connecting to the network through the Mobile Captive Portal of ExtremeControl.

Desktop

- Microsoft Edge: 41 and later
- Microsoft Internet Explorer: 11 and later
- Mozilla Firefox: 34 and later
- Google Chrome: 33.0 and later

Mobile

- Internet Explorer Mobile: 11 and later (Windows Phone)
- Microsoft Edge: All Versions
- Microsoft Windows 10 Touch Screen Native (Surface Table): N/A
- iOS Native: 9 and later
- Android Chrome: 4.0 and later
- Android Native: 4.4 and later
- Dolphin: All Versions
- Opera: All Versions

Ordering Information

Model Number	Model Description
NAC Subscription Enterprise Licenses	
XIQ-NAC-S-1K-EW	ExtremeCloud IQ NAC SaaS Subscription and ExtremeWorks SaaS Support for 1K end-systems (one year)
XIQ-NAC-S-10K-EW	ExtremeCloud IQ NAC SaaS Subscription and ExtremeWorks SaaS Support for 10K end-systems (one year)
XIQ-NAC-S-100K-EW	ExtremeCloud IQ NAC SaaS Subscription and ExtremeWorks SaaS Support for 100K end-systems (one year)
XIQ-NAC-S-1K-PWP	ExtremeCloud IQ NAC SaaS Subscription and PartnerWorks Plus SaaS Support for 1K end-systems (one year)
XIQ-NAC-S-10K-PWP	ExtremeCloud IQ NAC SaaS Subscription and PartnerWorks Plus SaaS Support for 10K end-systems (one year)
XIQ-NAC-S-100K-PWP	ExtremeCloud IQ NAC SaaS Subscription and PartnerWorks Plus SaaS Support for 100K end-systems (one year)

Service and Support

Extreme Networks provides comprehensive service offerings that range from Professional Services to design, deploy, and optimize customer networks, to customized technical training, to service and support tailored to individual customer needs. Contact your Extreme Networks account executive for more information about Extreme Networks Service and Support.

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